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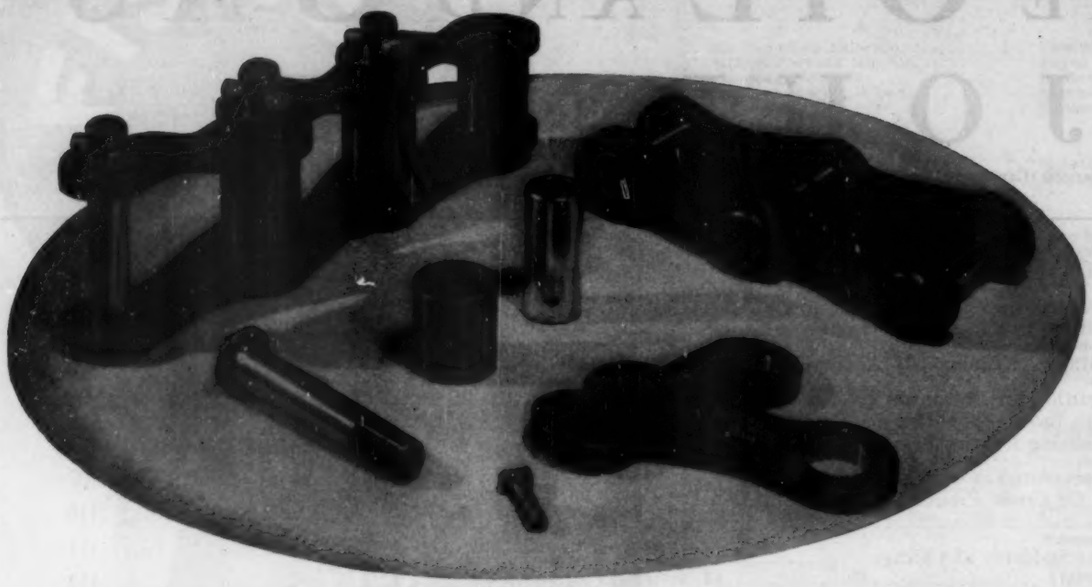

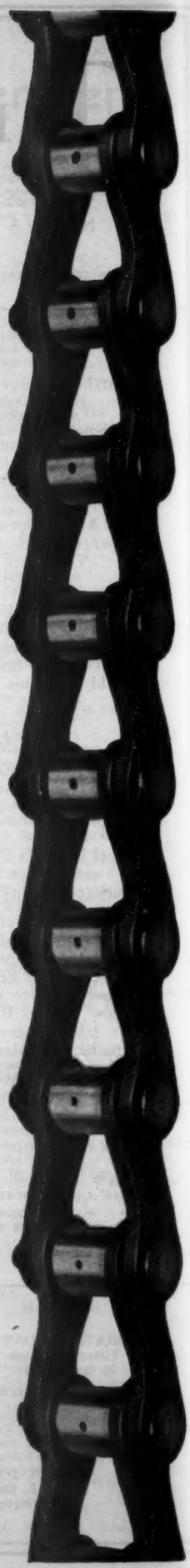

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Further Improvement in Price Structures Assured If East Texas Is Held to a Reasonable Limit

By ANDREW M. ROWLEY

CONTINUED strengthening of both the crude and refined oil price structures throughout the country reflects the belief further increases in crude oil prices are probable. The main factor in the situation now, as in the past, is East Texas. Optimism regarding the price outlook is based almost entirely on the feeling production in East Texas will be curtailed quite materially from the excessive output of recent months. Higher prices will be paid and will be justified if production in East Texas is reduced to a reasonable figure but unless that is done there can be no real improvement in the situation.

Oil men are hopeful operation of the Federal Industry Recovery law will bring crude oil production in line with demand. They believe when production is allocated to the different areas a real effort will be made to hold the output to the figure set. It is certain every influence will be used to prevent any section from causing the plan to fail. Co-operation between the Federal and State authorities is essential and such co-operation, backed by the active support of a majority of the oil companies, should obtain the desired results.

An interesting schedule of crude oil production for the balance of this year has been prepared by Joseph E. Pogue and is published in this issue. If the output of crude could be held to limits prescribed in that report the petroleum industry would soon be enjoying prosperity. The higher crude oil prices announced during the past week are merely an indication of what might be expected if East Texas were held to a reasonable figure. Past experience does not justify any great hopes that the new order and allowable for East Texas will be enforced effectively. But, as stated above, it is believed the new Federal law will go a long way towards correcting the situation.

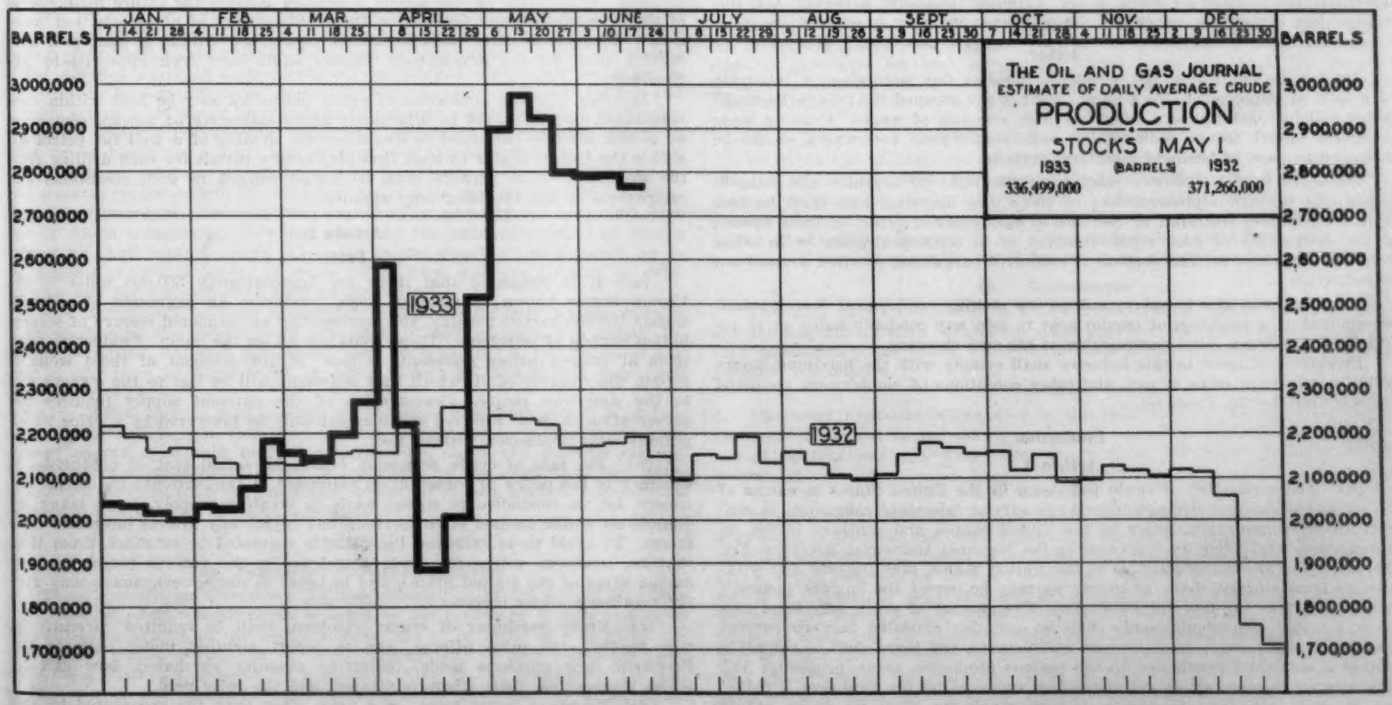
Gasoline prices have advanced sharply during the past two weeks and are higher now than they have been since last December. But they, also, are still below the point which would insure profitable operations. The increases, however, have improved the situation greatly and there is hope the price trend will continue upward. Refiners have been losing money and low prices for gasoline naturally have had considerable influence on the crude oil price structure. It will be far easier to get crude oil prices back to a reasonable level if the improvement in the refined oil price structure continues.

Crude Oil Production in the United States

Estimated daily average production for the week ending June 17, and a comparison with previous week and one year ago, follows:

Oklahoma —	June 17	June 10	June 18, 1932
Oklahoma City	120,620	180,835	119,720
Seminole-St. Louis	99,645	92,040	117,415
Remainder of State	186,715	182,435	215,850
Total Oklahoma	406,980	455,310	452,985
East Texas—			
Lathrop	370,250	379,975	124,492
Kilgore	273,115	286,280	101,435
Joiner	264,005	258,490	105,119
Total East Texas	907,370	924,745	331,044
West Texas	156,355	158,696	179,354
North Central Texas	64,938	64,905	75,468
Texas Panhandle	42,562	42,948	53,036
East Central Texas	58,443	58,433	58,987
Gulf Coast—Texas	178,415	180,525	109,045
Southwest Texas	53,495	53,094	59,615
Total State of Texas	1,461,578	1,483,346	866,549
Kansas	105,115	106,580	96,215
North Louisiana	25,185	25,325	29,550
Gulf Coast—Louisiana	40,500	41,052	31,846
Arkansas	30,320	29,940	34,060
Eastern Fields	108,000	106,000	121,000
Rocky Mountain area	75,180	73,620	80,716
California—			
Santa Fe Springs	54,500	54,000	61,000
Long Beach	74,500	74,000	74,000
Playa Del Rey	11,500	11,250	16,000
Elwood	13,750	13,000	14,000
Kettleman Hills	59,750	61,500	59,750
Remainder of State	266,000	261,750	254,750
Total California	480,000	475,500	479,500
Total United States	2,732,867	2,796,673	2,192,421

Decrease 63,806 Bbls. Daily.



Independents and Majors Unanimously Approve Code of Fair Competition for Oil Industry

By ROBERT C. CONINE
Chicago Bureau, The Oil and Gas Journal

CHICAGO, June 17.—Delegates of 39 associations representing approximately 95 per cent of the petroleum industry came to agreement today upon a code of fair competition for the petroleum industry to "accomplish and effectuate the policies set forth in the National Industrial Recovery Act." Formulation of the code began Wednesday following the invitation of Axtell J. Byles, president of the American Petroleum Institute, to associations connected with the producing division of the industry to send five delegates to discuss and prepare a tentative draft of a code of practices to deal with production in conformity with the Federal law.

The code covering the producing branch of the industry was designed with a view of facilitating co-ordination of its principles with those which may be set forth in the code to be similarly evolved June 22, for the marketing branch of the industry by delegates from associations principally interested in the marketing of refined petroleum products. Necessity was not seen for a similar code of practices to govern the activities of refiners, as it was thought that regulations at the refiners' sources of supply, and at their outlets for products appeared to be sufficient.

Meeting Was Harmonious

An entirely new atmosphere pervaded the sessions attended jointly by the so-called independents and majors. It appeared that all of the usually clashing elements were leaning backward to promote harmony and to meet the "other fellow" halfway. As the general sessions progressed it became increasingly difficult to distinguish a "major" interest from an "independent" interest by the recommendations made on the floor, and in the final arguments today there was nothing surprising in the fact that a dozen executives of the largest crude oil producing companies in the country should jump to their feet to champion an amendment or a resolution offered by the smallest independents.

As the various amendments to the original drafts were deliberated, the intention of the men assembled to produce a code "full of teeth" was strikingly manifest. A continual striving to close up all possible loopholes delayed the proceedings somewhat, but no charges of quibbling were heard, and in the end the code, which has been approved piece-meal, was approved as a whole unanimously. While it was strongly urged that the approval given by the delegates should be considered final, it was decided to make full acceptance by the entire producing branch of the industry doubly assured by submission of the completed code to the memberships of the various associations. The utmost dispatch was urged in getting the code before the associations so that the code accepted by the producers might be at the service of the marketers during the formulation of their part of the final "code of fair competition for the petroleum industry" to be transmitted to President Franklin D. Roosevelt, as provided in the National Industrial Recovery Act.

A determination to take nothing for granted was strongly evidenced by the oil men. While it was admitted readily enough that the code being drafted would have far greater force than the code of marketing practices promulgated by the American Petroleum Institute for several years, the "independent" and "major" alike were insistent that no time should elapse before the police power be applied to correct evils in the industry.

Resolution on Licensing

Louis A. Titus, Washington representative of the Independent Petroleum Association of America, offered upon the completion of the code the following resolution to be sent to the President with the finished code.

"It is the sense of this meeting that price cutting and other activities now exist in the petroleum industry which makes it essential to license the business of producing, transporting, refining and marketing of petroleum and its products in order to make this code effective, and to effectuate the policy of Title I of the National Industrial Recovery Act, we therefore request that the President call a hearing upon such public notice thereof as he shall specify in order to determine whether or not it be essential to license the above named divisions of the petroleum industry in order to make effective this code and to effectuate the policy of Title I of the National Industrial Recovery Act, and we further request that such hearing be held at the same time and place as the hearing on this code."

C. B. Ames, chairman of the board of the Texas Co., suggested that the effect of such a resolution might be the carrying to the President the implication that the oil men had little confidence in the effectiveness of their code. At least, Mr. Ames thought, it should be ascertained whether or not the operation of the code would remedy the evils pointed out. At this point K. R. Kingsbury, president of Standard Oil Co. of California; H. F.

"Code of Fair Competition" for the Petroleum Industry

Purpose

In order to eliminate unfair competition in the petroleum industry, to insure the conservation of the petroleum resources of the country, to eliminate unfair trade practices, to increase employment, to establish fair and adequate wages, to enlarge the purchasing power of persons related to this industry, to improve the standards of labor, to protect the consuming public from excessive prices, to avoid the premature abandonment of wells of settled production, to so restore the American petroleum industry that it may promote the general welfare and common prosperity of the American people, and to accomplish and effectuate the policies set forth in the National Industrial Recovery Act, this code of fair competition governing the petroleum industry is adopted.

Labor

During the depression the petroleum industry has maintained a relatively high ratio of employment. To a large extent it has pursued the "share-the-work" policy and has maintained a relatively high schedule of wages. Existing wage schedules should not be reduced, but both employment and wages should be increased as soon as business conditions permit.

Employes in this industry shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection.

No employe in this industry, and no one seeking employment therein, shall be required as a condition of employment to join any company union or to refrain from joining a labor organization of his own choosing.

Employers of labor in this industry shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment approved or prescribed by the President.

Production

Article 1

(a) The production of crude petroleum in the United States in excess of the reasonable market demand injuriously affects interstate commerce, is contrary to the conservation policy of the United States, and contrary to the industrial recovery policy as expressed in the National Industrial Recovery Act. Therefore, the allowed production in the United States, plus imports and withdrawals from storage shall, as nearly as may be, equal the current domestic consumption plus the demand for export. The amount of crude petroleum necessary to meet such requirements shall be equitably allocated between current production, withdrawals from storage, and imports, and there shall be equitably allotted a maximum production to the various producers, areas, properties and wells located thereon, all as determined or approved by the President. Production of crude petroleum in excess of such maximum allotment is an unfair method of competition within the meaning of the National Industrial Recovery Act. Any person who receives crude petroleum produced in violation of this code, or the products of such petroleum for the purpose of transportation, storage, refining or purchase, shall be guilty of unfair competition. Such allotments of production shall be made with due regard to the conservation of oil and gas and reservoir energy in oil fields. Allotments of production shall also be such as will, to the fullest practicable extent, preserve wells of small production.

Drilling

(b) Wildcatting should not be prohibited because the future maintenance of the petroleum supply depends on future discoveries of new pools, but when a new discovery is made there should be no further drilling in that pool area until a plan for the development thereof shall have been approved by the President.

In order that the production of crude petroleum may be held within such reasonable amount as not to injuriously affect interstate or foreign commerce, no person shall be permitted to commence the drilling of a well for petroleum within the United States without first obtaining a permit for such drilling from the President. Such permits shall be issued subject to such conditions and restrictions as the President may approve.

Article 2

Price

(a) It is estimated that there are approximately 300,000 wells in the United States known as stripper wells, producing an aggregate of approximately 500,000 barrels per day, and representing an estimated reserve of several billion barrels of petroleum. These wells are all on the pump. Production from them at present prices represents a loss. If abandonment of these wells is forced, the reserves of oil which they represent will be lost to the owners and to the American people. Conservation of the national supply requires the preservation of these reserves and they can only be preserved by a price which permits their production without loss.

(b) The sale of crude petroleum below the actual cost of production is contrary to the policy of conservation expressed in the National Industrial Recovery Act, is conducive to waste, tends to create monopoly, is in many instances an unfair method of competition and injuriously affects interstate commerce. To avoid these evils the President is requested to establish, from time to time, minimum prices for crude petroleum in the various petroleum producing areas of the United States, and in order to protect consumers may also fix maximum prices therefor.

(c) Every purchaser of crude petroleum shall be required currently to post publicly the price offered, and to report monthly under oath to the President each purchase made, indicating quantity purchased, how and by whom transported, from whom purchased, and the price paid.

(d) To pay a secret price, or a price other than the one posted by the

Sinclair, chairman of the board of Consolidated Oil Co.; E. B. Reeser, president of Barnsdall Refineries, Inc.; Wirt Franklin, president of the oil company of his name and of the Independent Petroleum Association of America, arose to advocate the drawing up of the resolution offered by Mr. Titus. In defense of the resolution Mr. Kingsbury said:

Desire Quick Action

"We had our experience with the code of ethics which is now nothing but a scrap of paper east of the Rocky Mountains. Here we are, on invitation of the Government, asked to put the oil industry on a profitable basis. We are asked to tell the Government what we need. We pass this admirable code, just as we did the other one. Are we going to wait six or eight months before we call upon the law to make this code more effective than the one which proved such a failure for the marketers?"

Mr. Sinclair said: "I opposed proration because I thought that it was not properly administered, and I was licked. I joined the advocates of proration then to see if it could not be administered properly, and I was licked again. The code of fair competition for the petroleum industry, when it is approved by the President, becomes law, and law requires policemen. The licensing feature will stop hot oil in any field. I find no objection to the licensing feature among the oil company presidents with whom I have discussed it. The President knows the condition of the oil industry. We have cut prices everywhere and conditions are deplorable. I believe that everyone in the oil business would be happier, more contented, and would feel safer if the licensing feature would become effective."

Charles F. Roeser, vice president in charge of the production division of the American Petroleum Institute, who acted

(Continued on Page 26)

purchaser, shall be deemed unfair competition and a violation of this code if the transaction occurs in interstate or foreign commerce, or affects such commerce by coming in competition with other crude petroleum or a product thereof, which is sold or moved in interstate or foreign commerce.

Article 3

Petroleum in Storage

There exists at the present time petroleum in storage in the United States in excess of the reasonable requirements therefor. Excessive withdrawals from such storage will tend to reduce prices below cost of production, will create waste, and will injuriously affect interstate and foreign commerce. Therefore withdrawals from storage may be limited by the President under rules and regulations prescribed by him. Withdrawals from storage shall be equitably allocated among the various persons holding such storage. Withdrawals of crude petroleum in excess of current supply shall not exceed in the aggregate an average of 100,000 barrels per day. Suitable regulations shall also be made for limiting withdrawals from storage of petroleum other than crude for purposes of refining.

Article 4

Imports

The importation of crude petroleum and the products thereof in large quantities is hereby declared to be unfair competition injuriously affecting interstate commerce. Therefore the President is requested to limit the imports of crude petroleum and the products thereof to an amount not exceeding the average daily imports into the United States during the last six months of 1932. Such imports to be allocated to the various persons desiring to import such petroleum and the products thereof in such equitable manner as the President may determine.

Article 5

Other Provisions

(a) It shall be lawful for producers in any pool to restrict their production by agreement, the quantity to be stated in the agreement, and when any such restrictive agreement is made for any pool by those controlling wells having a maximum production of two-thirds of the entire maximum pool production, and such agreement is approved by the President, after such reasonable notice and hearing as may be determined by the President, it shall be deemed unfair competition if any person, whether a party to the agreement or not, shall then and there produce crude petroleum in excess of the rate of production allotted to such person therein; and if such crude petroleum so produced in excess of restriction or any product thereof in whole or in part, is sold or moved in interstate or foreign commerce, or is sold or moved in competition with other crude petroleum or a product thereof which is sold or moved in interstate or foreign commerce, such transaction shall be deemed a violation of this code.

(b) It shall be deemed a waste of natural resources, unfair competition and a violation of this code if any person engaged in the petroleum industry in any state shall produce crude petroleum or any product thereof in excess of the allotted share of such person of the demand and dump the same in interstate or foreign commerce, or in intrastate commerce in such manner and to such extent as to divert or otherwise injuriously affect interstate or foreign commerce, under circumstances reasonably calculated in economic effect to bring prices below the normal and average cost of production.

(c) Every producer or seller of crude petroleum shall be required to report monthly under oath to the President the number and locations of his wells, quantity of petroleum produced from each well or property, quantity sold, how and by whom transported, to whom sold, and the price received. Any person storing oil shall make a sworn statement to the President each month as to the amount of storage stocks of crude oil on hand and the accruals or withdrawals and the disposition of such withdrawals.

(d) Agreements between competitors within the industry for the purpose of accomplishing the objectives of this code, or any of them, are hereby expressly permitted, but such agreements shall be submitted to the President and may at any time be disapproved by him. Upon such disapproval they shall cease to be valid.

(e) Where any oil pool is made up of leases separately owned by different operators, nothing in this code shall be interpreted to authorize the compulsory operation of such pool as a single unit under one management and thereby force each separate owner to contribute to the expense of and share in the returns from such unit operation unless all of such operators owning all of such leases consent to such unitization.

Article

(a) Emergency National Committee

There shall be an Emergency National Committee of the petroleum industry to consist of 26 committeemen selected by the producing branch and 26 by the marketing branch of the industry, selections to be made so that every section of the United States will be fairly represented. Of this committee there shall be a chairman, selected by a majority vote of the committee. He may or may not be one of the 52 committeemen above provided for. If he is not one of them the result will be a committee of 53, including the chairman.

(b) Emergency Executive Committee

The Emergency National Committee shall select from its membership an Emergency Executive Committee composed of the chairman of the Emergency National Committee, who shall be also chairman of the Emergency Executive Committee, and eight others. The Emergency Executive Committee thus constituted shall have all the authority and power of the Emergency National Committee when the Emergency National Committee is not in session.

(c) Powers and Duties of Committees

The Emergency National Committee shall be the general planning and coordinating agency for the industry. It shall make rules and regulations and gather such statistics as it may deem necessary, and upon complaint of interested parties or upon its own initiative may make inquiry and investigation into the operation of this code, and shall aid the President and his delegates in the administration of this code and the National Industrial Recovery Act.

The committee shall make and publish, from time to time, such forecasts on these subjects and especially of future demand, including exports, as to it may seem advisable. It may call upon and require producers, refiners, marketers, transporters and all others engaged in the petroleum industry for information and reports, to enable it not only to make the findings required by this code, but when the restrictions herein provided are in force, to know the extent to which such restrictions are operative and who are violating the rules and regulations, and failure of any person to comply with the committee's request for data and information in the form prescribed shall constitute a violation of this code.

The committee shall utilize to the fullest extent possible the facilities of any and all existing trade associations, national, regional or local in the petroleum industry in such manner as may seem most useful to the work of the committee. It may form or cause to be formed advisory committees and committees to co-operate in the administration of this code, the National Industrial Recovery Act, and the rules and regulations thereunder.

(d) The Chairman

The chairman of the committees shall have and exercise such authority as may be delegated to him by the committees. All communications and conferences of the petroleum industry with the President or with his agents concerning the approval or amendment of this code or any of its provisions or any matters relative thereto shall be through the committee.

(e) Vacancies

All vacancies in the Emergency National Committee and the Emergency Executive Committee shall be filled by the Emergency National Committee. Members of all committees shall serve until June 15, 1935, when their terms shall expire.

(f) Quorum and Procedure

The Emergency National Committee shall determine from time to time the number of its members requisite to a quorum, and the number of members of the Emergency Executive Committee requisite to a quorum. It shall also adopt rules of procedure for both committees. Each committee shall fix its own meeting dates and place or places of meeting. Members of the committees may designate alternates to act for them at meetings of the committee.

(g) Fees and Assessments

No initiation or entrance fee shall be charged, but, to cover the actual expenses of administration, assessments shall be made by the Emergency National Committee of the petroleum industry, hereinafter provided for, which assessments shall be a fair and equitable basis, considering the nature and extent of operations carried on by those subject to assessments, and assessments shall be paid promptly when due by those assessed.

(h) Amendments

This code may be amended by a two-thirds vote of the entire membership and the amendment shall take effect when approved by the President, provided that reasonable public notice for 10 days shall be given to the industry of the proposed amendment.

Article

The word President where used in the code shall be interpreted to mean either the President or any agent, employe or agency to whom he may delegate any of his functions or powers under the terms of the National Industrial Recovery Act.

Article

To effectuate the policy of the National Industrial Recovery Act, the coordination of Federal and state agencies is desirable; this code expresses not only the view of the industry as to what is a sound conservation program but also a sound program for recovery under the National Industrial Recovery Act and it is respectfully suggested that the President request the enforcement officers of the states having statutes relating to the subject of conservation to adopt as their own the program which may be approved and promulgated by him in order that the complete power of both Federal and state governments may be exerted in the premises. When so adopted by the state enforcement agencies, it shall be deemed unfair competition to violate the rules, regulations and orders of such state officials issued pursuant to such program.

New Rectifying Plant at Union Company Refinery Incorporates Unusual Construction Features

The Union Oil Co. has recently placed in service a pressure distillate rectifying plant in its Wilmington, Calif., refinery. This plant has a number of new and novel features which were worked out by the engineers of Union Oil Co. and Foster Wheeler Corp. Factors governing the unusual design of the rectifier are the necessity of operating without the use of either steam or recycle stock as a source of heat. It was also desired to take a side stream from the rectifying column and it was necessary to use the waste overhead as fuel in the refinery although the expense of erecting a large storage gas holder was not justified.

The rectifying unit has a capacity of 420,000 gallons of raw feed per day and operates at such pressure as will permit the recovery of waste overhead in liquid form, thus allowing storage of the overhead in tanks for refinery use. This liquid fuel can then be vaporized into the refinery's fuel system as required to supplement the available fuel gas.

The rectifying column is of unusual height since it contains 50 plates. The purpose of such a high column is to obtain sharp fractionation with a reflux rate of only 3 to 1. The low reflux rate in turn reduces the size of cooling tower required, the size of condensers and the amounts of cooling water and heat input needed.

Heating at the base of a rectifying column is usually accomplished with steam or recycle stock but in this case a portion of the bottoms product is circulated through a gas fired heater and back into the column. In this manner sufficient liquid is vaporized to supply latent heat of vaporization higher in the tower.

Accessibility Features

The tower is built for maximum accessibility, having a flanged top head through which all of the trays are removable. A jib is provided at the top of the tower for handling both the head and trays. Overhead vapors are removed from the top of the tower below the flanged head and are condensed in atmospheric condensers located in the cooling tower. Condensed reflux is delivered to a reflux tank and the surplus passes on to the liquid gas storage tank.

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Simplified flow chart showing fractional break-up of pressure distillate into liquefied gas, pentane and stabilized distillate

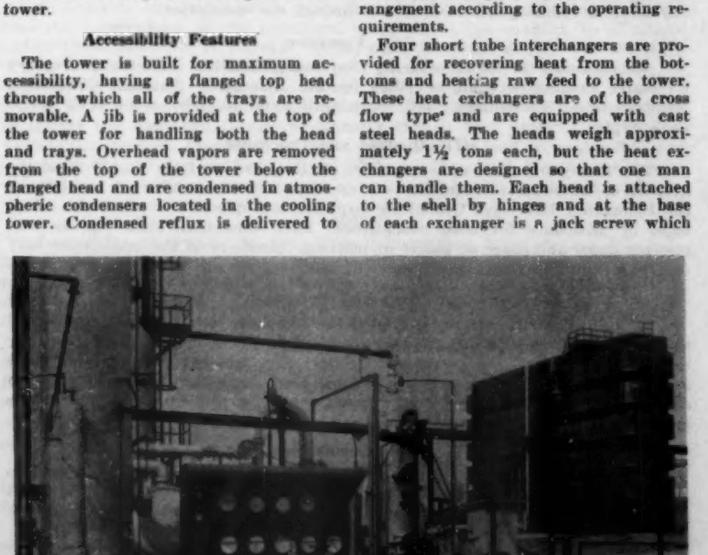
A pentane stream taken from the side of the tower is delivered to an atmospheric cooler in the cooling tower and thence to storage. The bottoms which are not recirculated through the direct fired bottoms heater are delivered through short tube type interchangers to atmospheric coolers in the bottom of the cooling tower. All of the atmospheric coolers and condensers are of the standard Foster Wheeler construction, in which the baffles in the heads may be removed or relocated to give any desired flow arrangement according to the operating requirements.

Four short tube interchangers are provided for recovering heat from the bottoms and heating raw feed to the tower. These heat exchangers are of the cross flow type and are equipped with cast steel heads. The heads weigh approximately 1½ tons each, but the heat exchangers are designed so that one man can handle them. Each head is attached to the shell by hinges and at the base of each exchanger is a jack screw which permits raising or lowering the heads to enter the studs. The heads are also provided with screws by which they can be pushed off the studs. The gaskets between the heads and tube sheets are solid aluminum.

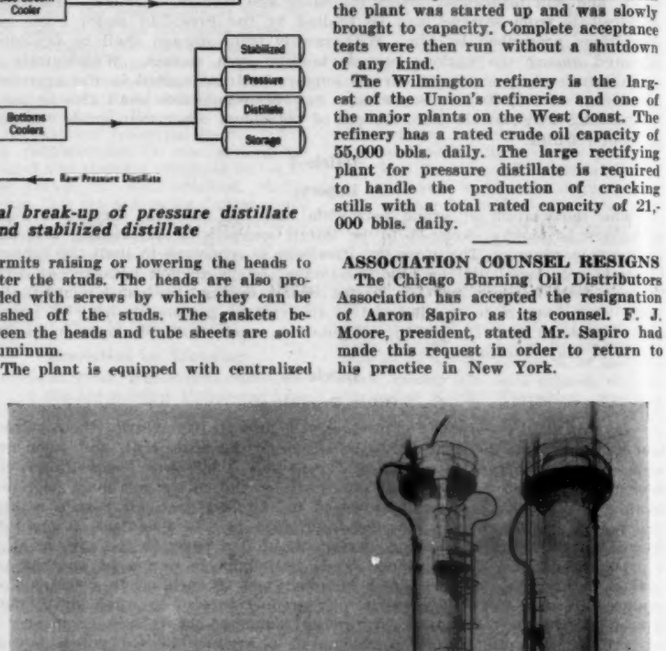
The plant is equipped with centralized control system and a complete set of indicating and recording instruments for testing operation and keeping a permanent record of results. The tower is equipped with sample connections and thermo couples at alternate plates, and thermo couples are also placed on the inlet and outlet of every piece of heat exchange equipment. It will thus be possible to obtain very valuable research and operating information on the performance of this stabilizing unit.

After completion of construction work the plant was started up and was slowly brought to capacity. Complete acceptance tests were then run without a shutdown of any kind.

The Wilmington refinery is the largest of the Union's refineries and one of the major plants on the West Coast. The refinery has a rated crude oil capacity of 55,000 bbls. daily. The large rectifying plant for pressure distillate is required to handle the production of cracking stills with a total rated capacity of 21,000 bbls. daily.



Pressure distillate stabilizer showing the pumps in the foreground and instrument board in the background. At the extreme left is the stabilizing column. The vertical tank at the right of the instrument board is the reflux tank. The atmospheric coolers and condensers are placed in the base of the cooling tower at the extreme right



General view of Union Oil Co.'s pressure distillate rectifying plant. The vertical tank at the extreme right is for liquefied gas. The fractionating tower is the tall one at the left

ASSOCIATION COUNSEL RESIGNS

The Chicago Burning Oil Distributors Association has accepted the resignation of Aaron Sapiro as its counsel. F. J. Moore, president, stated Mr. Sapiro had made this request in order to return to his practice in New York.

Recent Changes in Merchandising Policies Give Sound Basis for Marketing Practice Code

By C. O. WILLSON

This week the first meeting of an official nature will be held for the purpose of adopting a code of practices to cover the sale of refinery products under the authority of the National Industrial Law which President Roosevelt after signing described as a "vital test" which will determine whether "we must go in many groping, disorganized, separate units to defeat or move in one great team to victory." Applying the latter statement to the particular problem of the refining and marketing branches of the oil industry, the test of the next few weeks will be to determine whether those engaged in the manufacture and sale of refinery products can agree on some workable plan which will receive the approval of the Government as a satisfactory yardstick to differentiate between the good and bad in marketing practices. Failing in this objective, the two branches—if all the provisions of the new law are to be taken seriously—will have a code prepared for them by representatives of the Government which they will be forced to accept.

Informal discussions among executives, including the heads of legal departments, over the past 10 days have, as usual, resulted in some differences of opinion as to the scope of the new law in its application to marketing practices of the oil industry. Also, granting that the act gives almost unlimited authority in controlling operations, the question arises just how far it is possible to go and still retain the advantages of competitive operations, including company individuality. These angles indicate the extent of the problem which confronts representative leaders of the industry.

Want Quick Action

During the past week there was considerable support to a program which calls for immediate action in the adoption of a code to stop the most objectionable practices which have been largely responsible for unsatisfactory conditions as they have gradually developed over the past few years. This code would be submitted to the President and if approved could be made effective immediately. Later the more controversial practices could be further considered and, if possible, agreements reached and made a part of the code. The opinion is that new problems will arise from time to time under government supervision of business activities which will necessitate constant consideration by the individual industries and require many changes in the codes originally adopted.

Fortunately, the marketing branch already has a Code of Ethics which can be changed quickly to meet new requirements with all the directing staff needed at least for initial operation and a regional organization which covers the entire United States. This code, adopted and directed by the American Petroleum Institute several years ago, has been operating under many handicaps because of numerous legal restrictions, but, in the opinion of many, has several definite accomplishments to its credit which will tend to simplify the work of a more extensive code of practices made possible by the new law. It is believed that if the industry can come to an agreement as to the necessary additions to be made in the present code that a great deal can be accomplished before the end of summer.

New Marketing Policies

The steps to be taken in an effort to "standardize" practices in distribution of petroleum products has tended to emphasize the importance of recent changes in gasoline marketing policies which have been adopted by a number of major companies whose operations cover the greater part of the United States. While the initial code may not do so, it is assumed that ultimately the industry at its own or the Government's instigation will find it expedient to work out some basis of determining prices to which the entire industry can subscribe. It is pointed out that this does not necessarily point to price control by the Government but does mean a price basis from which fair margins to cover marketing costs can be worked out and which will do away with the chance of the whole plan being nullified due to the fact that one area is out of balance with another. It is impossible to entirely divorce any code of practices from the proposition of price and any attempt to ignore this basic fact, it is contended, will ultimately result in disaster.

Although the new gasoline marketing plans as inaugurated by major companies vary in many details they have had one common result and they all have recognized one basic condition. The most apparent result has been reductions in the spreads allowed to cover marketing costs after the gasoline has left the refineries. This was considered a necessary preliminary step in any program which aims to establish stable conditions. Too wide spreads in the past have furnished the basis for unethical practices from which all have suffered regardless of whether or not they participated in the practices.

The new policies also recognize the dominant position of the so-called spot refinery gasoline prices as a basis for determining prices to consumers.

The Standard Oil Co. of Ohio in its new marketing plan starts out with the Oklahoma (Group 3) tank car market as the base price for its entire schedule. The situation is similar in the case of the Standard Oil Co. of New Jersey and the Standard Oil Co. of New York, which in their eastern marketing schedules start with the Gulf Coast coastwise market as the base price. Due to competitive conditions the Gulf Coast and Oklahoma market are very closely allied so that in effect the three Standard companies and others who have adopted their recent changes are all operating on the same general base price structure. While not officially made a part of its pricing plan, the Standard Oil Co. (Indiana) also recognizes the Oklahoma tank car market as the base of its price structure.

Reason for Base Price

It is apparent from inquiries that many in the oil business not directly connected with refining and marketing operations do not understand why such importance should be given to the Oklahoma market in determining prices far removed from that State. Market students who have made a study of this situation can present convincing arguments showing the fundamental character of this tank car price as the controlling factor in all markets extending from crude oil at the wells to consumers of finished products. It has been described as the one open market in the industry which has defeated all efforts to nullify its importance. In 1932 and 1931 repeated efforts were made to establish higher posted prices for crude oil through arbitrary control of current production. Gasoline tank wagon and service station prices in many cases were advanced in line with these higher crude oil price schedules and it was assumed by those not familiar with the workings of the tank car markets that conditions had been permanently remedied. Leaks quickly developed. Bootleg crude oil became available to small refiners who quickly refined the crude and offered the gasoline and other products on the spot tank car market. Other refiners with excess crude supplies ran the oil to their stills and offered the finished products without regard to whether or not the net return was in line with the posted schedules for crude oil or the retail prices which a majority of the industry were attempting to maintain. All these developments were immediately reflected in the tank car markets. That market continued weak in the face of higher posted crude oil prices. Ultimately these low tank car prices tore down the entire price structure and that development was the fundamental explanation of the collapse in crude prices the latter part of last year and the fore part of this year.

The importance of this tank car market is further emphasized by the fact that a

(Continued on Page 27)

SUMMARIZED EXPLANATION OF NEW PRICING POLICY ADOPTED RECENTLY IN SEVERAL MARKETING AREAS

Table showing the application of the Standard Oil Co. of Ohio new pricing policy covering all classes of buyers in Ohio. While differing in several details, the new pricing policies adopted by major distributors in other marketing areas accomplish the same objective.

Cents per gallon	
2.75	Base price in Oklahoma for U. S. Motor gasoline of 65 octane rating.
2.25	Arbitrary transportation cost adopted to determine base price in Ohio.
5.00	Base tank car price for 65 octane U. S. Motor gasoline delivered to jobbers and other tank car buyers at any point in Ohio. Obtained by adding the previous two items.
5.50	Tank car price in Ohio for U. S. Motor gasoline of 59 or below octane rating, commonly called third grade gasoline. Obtained by subtracting one-half cent from the base price for 65 octane U. S. Motor gasoline. This is also a delivered tank car price in Ohio.
8.00	Tank wagon price to controlled dealers, obtained by adding 3 cents to the base tank car price. This is a delivered tank wagon price to dealers who handle Standard of Ohio products exclusively at their stations.
8.50	Tank wagon price to open dealers and commercial tank wagon accounts. Obtained by adding 2.5 cents to the base tank car price. This is a tank wagon price to uncontrolled dealer accounts and commercial buyers who purchase in tank wagon lots.
13.50	Posted service station price obtained by adding 7.5 cents to the base tank car price.
5.50	State tax of 4 cents and Federal tax of 1½ cents.
19.00	Posted service station price obtained by adding two previous items.
17.00	Net service station price allowed to cash customers. Obtained by subtracting 2 cents from posted service station price.
8.50	Quantity discount price to contract tank wagon customers who purchase up to 6,250 gallons monthly. Obtained by adding 2.5 cents to base tank car price.
8.00	Quantity discount price to contract tank wagon customers who purchase between 6,250 to 25,000 gallons monthly. Obtained by adding 2 cents to base tank car price.
7.50	Quantity discount price to contract tank wagon customers who purchase more than 25,000 gallons monthly. Obtained by adding 1.5 cents to base tank car price.

Many Oil Associations Represented at Meeting to Formulate Industry Code

CHICAGO, June 17.—Axtell J. Byles, president of the American Petroleum Institute, opened the production code meeting attended by delegates representing nearly 40 oil associations, here on Thursday with the explanation that the purpose of those assembled was not to make a harness for the industry, but to fit on as smoothly as possible a harness that had been prepared by the Federal Government.

"The oil industry must prove that it is able to conduct its own business properly," Mr. Byles said, "in the period of a year or more of trial. If the industry does not right itself, preferably within a year, it is doubtful if the policy of private ownership and control will ever be returned."

Mr. Byles and W. R. Boyd, Jr., executive vice president of the Institute, then turned the meeting over to the associations gathered. J. Edgar Pew, vice president of Sun Oil Co., was elected chairman of the meeting, and a roll call showed the following representatives present: Jake L. Hamon, Southern Oklahoma Stripper Well Association; H. L. Hunt, J. P. Shannon, George D. Morgan, Charles F. Roeser, E. H. Eddleman, Texas Oil and Gas Conservation Association; Wirt Franklin, Russell B. Brown, Louis Titus, Arthur Seeligson, Marvin Lee, Ralph J. Pryor, C. E. Buchner, Independent Petroleum Association of America; A. E. Baldwin, W. Bell, J. S. Young, E. B. Cochran, A. U. McCandless, Illinois-Indiana Petroleum Association; W. L. Ainsworth, E. W. Pyle, D. R. Lauck, Producers and Landowners Association of Kansas; R. T. Eastell, Beaver-Allegheny Washington & Green District Association; C. J. Weidman, N. W. Shiarella, E. L. McDonald, Kentucky Oil and Gas Association; A. S. Ritchie, Mid-Continent Oil and Gas Association, Oklahoma-Kansas division; Mark D Mitchell, Carl Weiner, Kansas Stripper Well Association; W. S. Halloran, A. S. Heck, West Virginia Oil and Gas Association; J. R. Simpson, Mid-Continent Royalty Owners Association; W. H. Francis, Mid-Continent Oil and Gas Association, Texas division; H. H. Smith, J. D. Collett, general Mid-Continent Oil and Gas Association; Bryan Payne, East Texas Producers and Royalty Owners Association; J. S. Bridwell, North Texas Oil and Gas Association; R. J. Whitehill, C. C. Harmon, C. D. Klingensmith, Northeast Oklahoma Stripper Well Association; Ed A. Landreth, Van S. Welch, New Mexico Oil Men's Protective Association; W. Hunter Atha, Corning District Association; H. B. Chester, Montana Division of I.P.A.A.; Henry Walker, J. H. Dugan, Mid-Continent Oil and Gas Association, Louisiana-Arkansas division; J. D. Sandefer, Jr., West Central Texas Oil and Gas Association; J. B. McEntire, East Texas Oil Land Owners Association; D. J. Sweeney, G. W. Holbrook, J. B. Bradley, New York

(Continued on Page 23)

Operating Schedule for Production of Crude Oil Is 2,162,000 Barrels Daily for Rest of Year

By JOSEPH E. POGUE
Consulting Engineer

The purpose of this report is to estimate the volume of crude oil that will be required from the principal sources of crude oil supply in the United States in 1933 and particularly in the last seven months of the year. In the calculation of these results which are designed to be suitable for the establishment of state production quotas, the problem has involved the development of a technique competent to arrive at workable schedules on a scientific basis, without regard to geographic bias or special interests. The study was undertaken at the request of a group of oil men representative of all sections of the country, but for the conclusions expressed the writer alone is responsible.

For the last seven months of 1933 a domestic crude oil production of 2,162,000 bbls. per day will meet the economic requirements of the American petroleum industry, allowing for withdrawal of 100,000 bbls. daily of crude oil from storage and reasonable production in inventories of products. This crude oil schedule is based upon an estimated gasoline consumption of 240,500,000 bbls. from June to December, inclusive, which represents a decline of 3.3 per cent from the corresponding period of 1932.

Of the total crude oil required, the volume that should be contributed by the leading producing states is calculated to be as follows:

PROPOSED PRODUCTION QUOTAS FOR JUNE-DECEMBER, 1933
(In barrels per day)

State—	Crude oil required	Proposed draft on stocks	Proposed quota to be produced
Texas	927,000	41,000	886,000
Okla.-Kans.	549,000	25,000	524,000
California	462,000	22,000	440,000
All Others	283,000	12,000	271,000
Total	2,262,000	100,000	2,162,000
Imports	71,000		71,000

It should be clearly understood that the foregoing figures are not forecasts of what the geographic subdivisions of production will be under unrestricted competition, but are computed schedules that will produce a balanced situation. The details underlying this summary are presented in logical sequence in Tables 1 to 7.

Technique Employed

As a member of the earliest Volunteer Committee on Petroleum Economics of the Federal Oil Conservation Board, the writer participated in the preparation of the first official estimate of crude oil requirements provided for the use of the industry. In that study the breakdown of crude oil needs into state quotas was based upon a method of allocation or subdivision of overall demand into its geographic components. The present investigation offers an improved method whereby state quotas are built up from studies of the interstate movements of gasoline and crude oil, which is a more precise approach to the problem and one not developed in the earlier work because of the lack of sufficient information at that time.

Briefly the present procedure is as follows: The country is divided into eight refinery districts corresponding to those employed by the U. S. Bureau of Mines in the compilation of its petroleum statistics. At the outset the demand for gasoline in each district is forecasted on the basis of tax figures and car registrations, and the summation of the districts checked against several supplementary methods of estimating gasoline consumption in the country as a whole. Then the interdistrict movements of gasoline are determined, and upon subtracting these transfers from the indicated consumption in each district and allowing for correlative sources of supply, a figure is arrived at which represents the volume of gasoline to be derived from crude oil. These results divided by appropriate recovery factors establish the refining quotas for each refinery district.

Next the interdistrict flow of crude oil is studied in relation to trade channels and transportation facilities; in this way the refining quotas are traced back to the sources of crude oil supply, and a summation of these sources provides the segregation of the crude oil requirements into states of origin. These final results are the state production quotas which are sought to be determined.

TABLE 1.—ESTIMATED DEMAND FOR GASOLINE IN 1933
(Figures in thousands)

Year—	Cars carried over	Production of cars	Exports	Total new cars added	Cars registered	Cars eliminated	Cars in use end of year	Average number cars in use
1928	20,716	4,359	582	3,777	24,493	2,617	21,876	21,296
1929	21,876	5,358	733	4,623	26,501	3,907	22,594	22,735
1930	22,594	3,356	465	2,951	25,545	2,858	22,687	23,640
1931	22,687	2,390	242	2,146	25,833	2,947	22,886	23,287
1932	22,886	1,371	120	1,251	24,137	*2,700	*21,437	*22,162
1933*	21,437	1,600	100	1,500	22,937	2,900	20,037	†20,737

Year—	Average number cars in use	Domestic consumption (‡)	Per cent change	Consumption per car (bbls.)	Exports (‡)	Per cent change	Total consumption (‡)	Per cent change
1928	21,296	338.4	+10.3	15.9	53.9	+18.7	391.3	+11.4
1929	22,735	380.6	+12.5	16.8	62.1	+17.4	442.6	+13.1
1930	23,640	397.7	+ 4.5	16.8	65.6	+ 5.6	463.3	+ 4.7
1931	23,287	407.6	+ 2.5	17.5	45.7	—30.3	453.3	— 2.2
1932	22,162	377.5	— 7.4	17.0	35.4	—22.5	412.9	— 8.9
1933*	20,737	367.0	— 2.8	17.7	28.0	—20.9	395.0	— 4.3

*Estimated. †Average number of cars in use shows a decline of 6.4 per cent in 1932 from 1932. ‡Millions of barrels.

TABLE 2.—CONVERSION OF ESTIMATED 1933 GASOLINE DEMAND INTO CRUDE OIL REQUIREMENTS
(Barrels in millions)

Gasoline demand—	1931	1932	1933 Estimated
Domestic demand	407.6	377.5	367.0
Exports	45.7	35.4	28.0
Total demand	453.3	412.9	395.0
Change from previous year, per cent	—2.2	—8.9	—4.3
Gasoline supply—			
Straightrun	220.0	195.4	189.7
Cracked	176.5	170.9	167.2
Natural used at refineries	35.1	26.3	24.5
Balance natural produced	8.5	9.5	7.5
Benzol	1.8	1.1	1.1
Imports	13.6	8.2	0.0
Change in stocks	+2.2	—1.5	—5.0
Total supply (net)	453.3	412.9	395.0
Crude oil required—			
Recovery, straightrun, per cent	24.4	23.8	23.5
Recovery, straightrun and cracked, per cent	44.3	44.7	44.2
Crude to stills	894.6	820.0	807.5
Crude exported	25.5	27.4	29.0
Crude burned, etc.	19.1	11.4	16.0
Total crude required	939.2	858.8	852.5
Imports, crude	47.3	44.7	29.7
Domestic crude required	891.9	814.1	822.8
Change in stocks	—41.0	—32.2	(*)
Domestic production	850.9	781.9	(*)
Domestic production	†2,331	†2,142	(*)

*Not ascertainable because of unknown degree of overproduction in April and May. See Table 3 for proposed draft on stocks June-December, 1933. †Thousands of barrels per day.

TABLE 3.—CALCULATION OF CRUDE OIL REQUIREMENTS FOR LAST SEVEN MONTHS OF 1933, SUBDIVIDED INTO SUMMER AND AUTUMN SEASONS
(Barrels in millions)

Gasoline demand, 1932 and 1933—	Year 1933	First 5 months	Last 7 months	Summer June-Sept.	Autumn Oct.-Dec.
Domestic, 1933	367.0	142.1	223.9	138.6	85.3
Domestic, 1932	377.5	146.4	231.1	140.7	90.4
Per cent change	—2.8	—2.3	—3.1	—1.5	—5.6
Exports, 1933	28.0	11.4	16.6	9.9	6.7
Exports, 1932	35.4	17.7	17.7	11.0	6.7
Per cent change	—20.9	—35.6	—6.2	—10.0	0.0
Total, 1933	395.0	154.5	240.5	148.5	92.0
Total, 1932	412.9	164.1	248.8	151.7	97.1
Per cent change	—4.3	—5.9	—3.3	—2.1	—5.3
Gasoline supply, 1933—					
Straightrun and cracked	356.9	145.7	211.2	121.9	89.6
Natural used at refineries	24.5	9.7	14.8	8.4	6.4
Balance natural produced	7.5	3.8	3.7	2.3	1.4
Benzol	1.1	0.4	0.7	0.4	0.3
Imports	0.0	0.0	0.0	0.0	0.0
Change in stocks	—5.0	+5.1	—10.1	—15.5	+5.7
Total supply (net)	395.0	154.5*	240.5	148.5	92.0
Crude oil required, 1933—					
Gasoline recovery from crude, per cent	44.2	43.5	44.7	45.0	44.4
Crude to stills	807.5	335.0	472.5	270.9	201.6
Crude exported	29.0	10.0	19.0	10.8	8.2
Crude burned, etc.	16.0	8.3	7.7	4.4	3.3
Total crude required	852.5	353.3	499.2	286.1	213.1
Imports, crude	29.7	14.5	15.2	8.7	6.5
Domestic crude required	822.8	338.8	484.0	277.4	206.6
Change in stocks	(*)	(*)	—21.4	—13.7	—7.7
Domestic production	(*)	(*)	462.6	263.7	198.9

In this manner the schedules of production appropriate for each state become end-products of a series of analytical steps based at every stage upon the movements of both gasoline and crude oil into the major markets of the country. By using a time-base of sufficient span the aberrations due to local overproduction and anomalous price gradients are at the same time avoided. Finally the results are checked against a flow study of fuel oil and appraised in the light of a balance sheet for all oil.

Calculations Simplified

The calculations underlying this technique are laborious and involved, so that for purposes of exposition it is necessary to simplify the presentation, but the tabulations are given with sufficient supporting data to outline the procedure and permit the results to be independently checked. Future computations of this kind could be greatly facilitated if official petroleum statistics were redesigned so as to measure directly the interdistrict movements of oil.

All units employed in this report are the ordinary ones, such as American gallons and barrels of 42 gallons each. So far as expedient the statistics are presented in units of million barrels, rounded out to one decimal place, thus facilitating the tabulations. The back data are based upon official government statistics, particularly those of the U. S. Bureau of Mines. Throughout the report gasoline is used to signify motor fuel, which is composed of straightrun gasoline, cracked gasoline, natural gasoline used in refineries, balance of natural gasoline produced, and benzol used in refineries.

An explanation is desirable as to the meaning of the word "demand" as used in this report. The definition of the term is important in view of the confusion that apparently exists in the application of "market demand" to proration schedules. Demand, of course, is not a fixed quantity but varies with price; moreover, demand is not synonymous with consumption, but is consumption plus or minus variations due to speculative influences. The most stable demand is that of the ultimate consumer, for it varies only slightly within the range of reasonable fluctuations in price. Refiners' demand is much more variable, for refiners can overproduce or underproduce in terms of consumer requirements. The crude oil producer feels the ultimate consumers' demand only through the medium of the refiner and hence the "market demand" for crude can fluctuate sharply within brief periods of time.

For example, if refiners, in a given month overproduce 1,000,000 bbls. of gasoline (a not uncommon occurrence), they inflate the demand for crude oil 75,000 barrels daily. For purposes of proration, therefore, quotas should be based upon the best ascertainable analyses of ultimate consumer demand, and it is upon this basis that the present report is constructed. It may seem an unwarranted assertion, but essential requirements for crude oil may be more accurately measured in an economic laboratory than in the field where producers feel the impact of the buyers' nominations.

Demand for Gasoline

For 1933 as a whole the demand for gasoline is estimated to be 395,000,000 bbls, against 412,900,000 bbls. in 1932, a decrease of 4.3 per cent. The total demand for 1933 is made up of domestic consumption of 367,000,000 bbls. and ex-

ports of 28,000,000 bbls., compared with 377,500,000 and 35,400,000 bbls., respectively, in 1932. These figures were arrived at by three independent methods: Forecasting demand separately in the eight refining districts, estimating consumption for the country at large on the basis of automotive data, and appraising the cyclical trend of demand, comparable results were obtained by the three methods, but for purposes of convenience the slight differences were reconciled to a common set of figures as shown above and in Tables 1 and 2.

It is admitted that this is a particularly difficult time to forecast gasoline consumption, because of the current complexity of the economic situation and the wide range of new factors to be considered. It is inevitable that the car population will decline this year and the computations given in Table 1 show a recession of 6.4 per cent. At the same time there is considerable evidence to suggest that the consumption per unit will increase. In fact unit consumption for the first four months of the year has risen about 3.8 per cent from the corresponding period of last year. A 6.4 per cent decline in car population coupled with a 4 per cent increase in unit consumption yield the estimates given in Table 1. Exports of gasoline are expected to show a sharper rate of decline than domestic consumption because of a substantial loss of foreign markets.

A 1 per cent error in estimating gasoline consumption affects crude oil requirements 25,000 bbls. daily, if all other factors remain constant. A large deviation in gasoline demand, however, is not likely to lead to an equally great variation in crude oil requirements, because the gasoline recovery factor tends to fluctuate with unexpected changes in demand. For example, if gasoline demand rises higher than anticipated, the recovery factor will increase so as to permit a barrel of crude to yield more gasoline; and vice versa. In short the demand for crude oil varies more sharply with changes in the recovery factor than with changes in the demand for gasoline, and the recovery factor is still fairly flexible, although some elasticity has been lost as a result of competition in respect to octane ratings.

Conversion of Gasoline Demand Into Crude Requirements

With gasoline demand estimated, it is possible to calculate the crude oil needed to meet this demand. The computations are presented in Table 2. It will be observed that the gasoline to be provided from sources other than crude, the volume to be drawn from stock, and the recovery factor are all variables affecting the final result. The recovery factor is made smaller than last year, because it has so far been lagging and a somewhat higher yield of distillates and fuel oil is a commercial desirability. It is also indicated that refiners should take 5,000,000 bbls. out of storage. In addition no importations of gasoline are anticipated, while imports of crude oil are expected to run 15,000,000 bbls. below last year.

Under the premises stated, the 1933 volume of domestic crude oil required will be 822,800,000 bbls., as compared with 814,100,000 bbls. in 1932. More domestic crude oil will be needed than last year, in the face of a decline in gasoline consumption, because of a reduction in imports of crude and gasoline.

Requirements for June-December, 1933

The analysis so far has dealt with the entirety of 1933. But practically five months have elapsed, and quotas obviously cannot be made retroactive. Table 3, therefore, carries the calculations into the final seven months of the year, and shows this period subdivided into the summer and autumn seasons. It is seen that the domestic crude oil demand will run a shade higher in the latter part of the year than for the year as a whole, while a fairly important seasonal variation will be manifest in the summer as compared with the autumn. This seasonal variation, however, can be readily removed by a moderate change in the rate of withdrawals from storage. It is accordingly suggested that the following quotas will cover the need:

DOMESTIC CRUDE OIL REQUIREMENTS
(In barrels per day)

	June-Sept.,1933	Oct-Dec.,1933
Demand for domestic crude	2,274,000	2,246,000
Proposed change in stocks	112,000	84,000
Proposed production in U. S.	2,162,000	2,162,000

A domestic production of 2,162,000 bbls. per day is therefore the calculated level of output that will create a balanced situation during the last seven months of 1933.

District Refining Quotas

For purposes of exposition the presentation of results has proceeded from the whole to the geographic parts, although the actual investigation began with the subdivision of the country into eight districts and the study of the flow of gasoline from one district to another. The analysis of the interdistrict movements of gasoline is given in Table 4 for the year of 1933. If for each district the net movement is subtracted from total consumption, and proper allowance made for incidental supply and change in stocks, the volume of gasoline to be derived from crude is determined, and this in turn establishes the volume of crude oil required, or the refining quotas. Thus refining schedules are determined as a step in the process of calculating state crude oil production quotas and are shown for each refining district in the last column of Table 4.

As there is no existent machinery for controlling refining operations according to predetermined plan, the refining quotas may merely be referred to as available if needed. If each refiner, however, is influenced by the same range of economic considerations that enter into the calculations here given, an approximate conformance to the schedules set out may be realized; and the approach to such agreement will be furthered in proportion to the extent to which the state production quotas are fulfilled.

SUMMARY OF DOMESTIC CRUDE OIL REQUIREMENTS
(In barrels per day)

	June-Sept. 1933	Oct.-Dec. 1933
Demand for domestic crude	2,274,000	2,246,000
Proposed change in stocks	112,000	84,000
Proposed production in U. S.	2,162,000	2,162,000

*Not ascertainable because of unknown degree of overproduction in April and May.

TABLE 4.—CALCULATION OF REFINING QUOTAS FOR 1933, BY REFINING DISTRICTS, BASED UPON ESTIMATED DEMAND OF INTERDISTRICT MOVEMENTS OF GASOLINE
(In millions of barrels)

	GASOLINE							Crude
Refining district—	Local consumption	Exports	Shipped to other districts	Received from other districts	Natural and benzol available	Proposed change in stocks	Remainder to be produced from crude	Required runs to stills
East Coast	120.7	4.8	3.5	61.7	0.7	—1.3	70.3	165.9
Appalachian	29.6	0.5	0.0	12.9	1.2	—0.1	15.9	33.1
Indiana-Ill.	102.4	0.8	5.0	49.7	1.6	—0.5	56.4	103.9
Okla.-Kansas	29.6	0.0	35.9	6.5	10.1	—0.4	48.5	91.8
Texas	18.4	7.3	66.9	0.0	5.8	—1.0	85.8	190.3
Louisiana-Ark.	12.4	2.6	7.2	0.0	1.4	—0.1	20.7	50.4
Rocky Mt.	11.5	0.0	0.6	3.7	0.9	—0.1	6.8	12.8
California	42.4	12.0	11.0	0.0	11.4	—1.5	52.5	155.3
Total U. S.	367.0	28.0	134.5	134.5	33.1	—5.0	356.9	807.5

TABLE 5.—CALCULATION OF SOURCES OF CRUDE OIL (STATE PRODUCTION QUOTAS) TO SUPPLY REFINING QUOTAS DETERMINED IN TABLE 4
(In millions of barrels)

		SOURCE OF CRUDE						
Destination of crude—	Volume required in 1933	Imports	Appalachian	Indiana Illinois Michigan	Okla. Kansas	Texas	Louisiana Arkansas	Rocky Mtn. New Mexico	California
East Coast	165.9	28.7	5.0	0.8	12.9	120.3	0.0	0.0	0.2
Appalachian	33.1	0.0	22.1	0.0	11.0	0.0	0.0	0.0	0.0
Indiana-Ill.	103.9	0.0	0.0	12.5	64.0	27.4	0.0	0.0	0.0
Okla.-Kans.	91.8	0.0	0.0	0.0	90.8	1.0	0.0	0.0	0.0
Texas	190.3	0.0	0.0	0.0	15.3	161.2	0.5	13.0	0.3
Louisiana-Ark	50.4	0.0	0.0	0.0	0.7	16.0	33.7	0.0	0.0
Rocky Mtn.	12.8	0.0	0.0	0.0	0.0	0.0	0.0	12.8	0.0
California	155.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	155.3
Exports	29.0	0.0	0.0	0.2	6.5	10.9	0.0	0.6	10.8
Burned, etc.	16.0	0.0	0.3	0.2	2.3	4.1	0.3	0.3	8.5
	852.5	29.7	27.4	13.7	203.5	340.9	34.5	27.7	175.1
(In thousands of barrels per day)									
Total crude required	2,336	81	75	38	558	934	94	76	480
Crude required last 7 months*	2,333	71	75	38	560	937	94	76	482
Proposed draft on stocks	100	..	3	2	25	41	4	3	22
Proposed prod. quotas	‡2,233	71	72	36	†535	896	90	173	460

*All figures from here on in this table apply to the last 7 months of 1933 (June-December). †Oklahoma 425, Kansas 110. ‡New Mexico 35, and rest of Rockies 38. §Domestic quota 2,162; import quota 71.

TABLE 6.—ESTIMATED EFFECT UPON 1933 FUEL OIL SITUATION OF LIMITING CRUDE RUNS TO STILLS TO 807.5 MILLION BARRELS AS REQUIRED TO CREATE A BALANCED GASOLINE SITUATION
(In millions of barrels)

	1931	1932	1933 Estimated
Domestic consumption, fuel oil	334.7	301.5	305.0
Exports, fuel oil	29.2	19.9	19.0
Total demand, fuel oil	363.9	321.4	324.0
Crude to stills	894.6	820.0	807.5
Recovery factor, per cent	37.7	35.9	36.3
Domestic production, fuel oil	337.0	294.3	293.1
Imports, fuel oil	25.9	21.2	15.7
Total supply, fuel oil	362.9	315.5	308.8
Total demand, fuel oil	363.9	321.4	324.0
Change in stocks, fuel oil	—1.0	—5.9	—15.2

TABLE 7.—BALANCE SHEET OF ALL OIL SHOWING EFFECT OF APPLYING SUGGESTED QUOTAS FOR LAST 7 MONTHS OF 1933
(In millions of barrels)

Supply of all oils—	1930	1931	1932	1933 Estimated
Crude produced in U. S.	898.0	851.1	781.8	*818.9
Natural gasoline produced	53.6	48.0	35.8	32.0
Benzol blended	2.7	1.8	1.1	1.1
Imports, crude oil	62.1	47.3	44.7	29.7
Imports, products	43.5	36.8	29.8	17.0
Total supply, all oil	1,058.9	982.6	893.2	898.7
Demand for all oil—				
Gasoline	463.3	453.3	412.9	395.0
Kerosene	51.6	44.0	44.2	46.0
Gas and fuel oil	405.0	363.9	321.4	324.0
Lubricants	31.5	28.2	23.4	21.0
All other products	41.4	77.2	75.3	74.0
Crude as such	52.3	41.6	38.7	45.0
Refinery losses	37.0	19.1	20.6	19.0
Total demand, all oil	1,082.1	1,027.3	936.6	924.0
Total supply, all oil	1,058.9	982.6	893.2	898.7
Change in stocks	—23.2	—44.7	—43.4	—25.3

*Includes:

January-March (actual)	200.3
April-May (estimated)	156.0
June-December (proposed production)	462.6
Total	818.9

State Production Quotas

The refining quotas determined in Table 4 become the starting point for the calculation of state production quotas as carried out in Table 5. The conversion of district refining schedules into state crude oil production quotas involves an analysis of the interdistrict movements of crude oil for past periods and an appraisal of trade channels, contractual arrangements, lines of integration, and other factors that tend to control the movements during the period under study. Additional elements such as exports of crude and the quantity of crude burned and lost in transit are also taken into consideration. After each district demand is traced back to its sources of supply, a summation of the items falling into each vertical column automatically yields the crude oil production quota appropriate thereto. The table is largely self-explanatory and space does not permit the detailed discussion of every item included. It will be observed, indeed, that Tables 4 and 5 together involve 171 possible variables and a complete discussion of all these factors separately is not feasible, if this report is to be held within reasonable bounds, although each of these elements has been carefully studied and appraised.

The upper part of Table 5 yields state production quotas for the full year of 1933. For practical purposes, however, it is necessary to recalculate the quotas so that they become applicable to the remaining seven months of 1933, June to December, for which period only it remains possible to employ them. The changes required are small and are shown in the lower part of Table 5. The results are summarized in the following tabulation:

PROPOSED CRUDE OIL PRODUCTION QUOTAS BY STATES FOR THE PERIOD JUNE-DECEMBER, 1933
(In barrels per day)

State—	Crude required	Proposed draft on stocks	Proposed production quotas
Texas	927,000	41,000	886,000
Okla.-Kans.	560,000	25,000	*535,000
California	482,000	22,000	460,000
La.-Ark	94,000	4,000	90,000
Rocky Mtn. and N. Mex.	76,000	3,000	†73,000
Appalachian	75,000	3,000	72,000
Ind.-Ill.-Mich	38,000	2,000	36,000
Total, domestic crude	2,362,000	100,000	2,162,000
Imports	71,000	.....	71,000
Grand total, all crude	2,333,000	100,000	2,233,000

*Oklahoma, 425,000; Kansas, 110,000.
†Rocky Mountain, 38,000; New Mexico, 35,000.

Discussion of Inventories

The quotas calculated in this report for the last seven months of 1933 call for a reduction in crude oil inventories of 100,000 bbls. daily, and this suggested draft on stocks is apportioned to each producing state pro rata to its crude oil demand. The reason that 100,000 bbls. daily is selected as an appropriate rate of withdrawal is because the aboveground inventories of crude oil on June 1, 1933 are approximately 4.5 per cent of the

proven underground reserve of oil and 4.5 per cent of the domestic crude oil requirement for the last seven months of the year is 102,000 bbls. daily. It is a fair principle to draw upon aboveground and underground reserves in proportion to their respective sizes.

The crude oil stocks in the United States are universally recognized as excessive. A surplus inventory is an accumulation of past overproduction and a claim on future demand; sooner or later it must be liquidated. While the ownership of the stocks is somewhat concentrated, the surplus inventory is a common liability, irrespective of ownership, and its movement into consumption is desirable and in fact inevitable. The suggested rate of liquidation would require six years to cut crude inventories in half.

It might be contended that a higher rate of liquidation than the one prescribed is desirable, especially in view of the additions of East Texas oil to storage in the spring of 1933. It is not deemed feasible, however, to make these quotas retroactive and some consideration is afforded the fact that a faster rate of inventory depletion would tend to be unduly deflationary at this juncture.

The refining schedules call for a reduction of 5,000,000 bbls. of gasoline stocks during 1933. A larger figure seems precluded by the requirements of the distillate and fuel oil markets. The incidence of the refining schedules upon fuel oil stocks is discussed in Section 13.

In general the suggested draft on stocks will constitute a buffer to absorb variations in demand not compensated in other directions.

Discussion of Imports

It will be observed that the domestic demand for crude oil as calculated runs higher in 1933 than in 1932 by 8,700,000 bbls., despite an estimated decline in gasoline consumption. (See Table 2.) This divergence is mainly caused by an anticipated drop in imports of crude and products. The quotas set forth call for a restriction of imports of both crude oil and products during the last seven months of 1933 to within 5 per cent of the levels of the second half of 1932, which was a period of abnormally low importations[1]; while no receipts whatever of foreign gasoline are admitted in the schedules. To meet the quotas set up it will be necessary for importing companies to limit themselves after June 1 to 71,000 bbls. daily of crude oil and 39,000 bbls. daily of fuel oil. Slightly higher imports of fuel oil might prove to be desirable for the reasons given in Section 13, but no deviations in the calculations have been made on this score.

Discussion of East Texas Field

While it is not the province of this report to discuss methods of allocating state quotas to the individual oil pools within the state, it is obvious that a schedule of 896,000 bbls. per day for Texas implies a reduction in the current rate of output of the great East Texas Field, which at the moment of writing is producing 1,000,000 bbls. per day, or over 100,000 bbls. daily in excess of the normal requirements for the whole state. It seems probable that the physical conditions involving the rate of production in East Texas are not generally understood, which may justify some explanation in this place. East Texas is a magnificent deposit of oil, combining accessibility, low cost, good quality, and favorable reservoir conditions. The oil is expelled by the pressure of a water flood advancing from the west. In its virgin condition the pressure, measured at the bottom of the wells, was approximately 1,620 pounds per square inch; on May 15, the pressure had dropped to 1,320 pounds, or a total decline of 300 pounds. Up to the same date the cumulative output of the field was approximately 300,000,000 bbls. Thus there has been a drop of 1 pound for each 1,000,000 bbls. of oil withdrawn. Engineering data permit it to be calculated that the average well will stop flowing when the bottom hole pressure declines to 900 pounds. Under a production rate of 1,000,000 bbls. per day the pressure is falling 5 pounds per 1,000,000 bbls., which indicates that the field would go on the pump in 84 days, or early in August. At the same time this rapid withdrawal is substantially reducing the volume of oil that can be ultimately recovered either by flowing or pumping.

The ideal rate of production, from an engineering standpoint, would be one that would synchronize with the encroachment of the water, thus preserving the pressure unimpaired. Such a rate would probably render 90 per cent of the oil recoverable by flowing. This condition could have been attained by the drilling of 1,500 to 2,000 wells and the maintenance of a production rate of 150,000 to 200,000 bbls. daily. With the field overdrilled, however, this ideal is no longer possible; but on the basis of 10,000 wells the critical rate of production, above which efficiency is rapidly lost, would be such as to produce a 1 per cent drop in pressure for each per cent of the ultimate production withdrawn. Eight-tenths of a pound decline per 1,000,000 bbls. of production would meet this requirement, and a daily rate of output of 325,000 bbls. per day would come close to representing an acceptable rate of output from a purely engineering standpoint.

It is of interest to note that for the four weeks ending May 20, the output of all pools in Texas excluding the East Texas Field was 560,000 bbls. daily. If this aggregate is subtracted from the Texas quota of 896,000 bbls. as calculated in this report, the remainder is 336,000 bbls. The latter figure closely checks with the production rate of 325,000 bbls. daily indicated by engineering data to be a critical point in efficiency extraction. Hence an output for East Texas in excess of 325,000 to 350,000 bbls. daily will not only unduly shorten the flowing life of the field but will also deprive other fields in Texas and other parts of the Mid-Continent of a portion of their accustomed markets.

Discussion of New Fields

In the proration machinery thus far developed, no adequate provisions have been made for the handling of new fields and indeed under any system of production control this issue constitutes a difficult problem. It is in fact impossible to regulate discovery according to any plan, because new fields cannot be brought in to order. It is clear, nevertheless, that the existence of a quota system implies the lack of need for new sources of supply and, in so far as the remainder of this year is concerned, it should properly devolve upon each state to make room within its own quota for such new fields as are unavoidable in order to minimize the disturbing effect of new developments upon the interdistrict movements of oil.

Bearing Upon Fuel Oil Situation

The calculation of state production quotas was guided primarily by the objective of creating a balanced gasoline situation but attention was also given to the effect of such schedules upon the fuel products. Indeed some adjustments had to be made in the trial sheets to care for these considerations, but broadly speaking, gasoline was regarded as the main product, and fuel oil as the by-product. In any industry manufacturing joint products the proper proportionating of output requires repeated adjustments, and combined equilibrium is rarely attained. So in the case of these calculations it was found difficult to equilibrate gasoline and fuel oil in view of the anticipated decline in imports of crude oil and fuel oil and the substitution therefor of lighter American crudes. This shift in supply, together with other more technical considerations having to do with the quality of gasoline will create some measure of unbalance in fuel oil markets, particularly on the East Coast, if the demand for this product stabilizes or shows some tendency to increase. The effect of the proposed crude oil schedules upon the fuel oil situation is estimated in Table 6, in which a fairly heavy draft on fuel oil stocks is shown.

If unanticipated, the indicated deficit in fuel products may reflect itself in the form of an overproduction of gasoline, but there are several ways in which that outcome may be avoided. The expedients that are available for improving the fuel oil balance include the concentration upon heavy Texas crudes for the suggested drafts on storage; the movement of California fuel oil to the Eastern Seaboard, together with heavy withdrawals from fuel oil stocks in Texas, the lowering of the gasoline recovery factor in the fall through shifts in refining procedure; the importation of some extra fuel oil from Venezuela; or some combination of these measures. If planned for in advance, the contingency suggested is not so likely to arise.

Balance Sheet of All Oil

As a final check on the validity of the crude oil schedules developed in this report, a balance sheet of all oil was drawn up and is presented in Table 7. Actual statistics are shown for 1930, 1931, and 1932, while the 1933 figures are estimates for the full year. A draft of 25,300,000 bbls. on stocks of all oil is indicated, if the production quotas are followed from June 1 on; this draft would be larger were it not for the considerable volume of oil overproduced in the East Texas Field in the spring of 1933. Overproduction to date this year has been largely confined to crude oil so that the statistical position of the various products have not yet radically deteriorated. In May, however, the oversupply of crude oil was beginning to stimulate undue refinery operations and a reduction of crude oil output to the bounds indicated is essential if the spread of overproduction into the field of refined products is to be stemmed.

[1] In 1932 imports were as follows, in thousands of barrels per day:

1932—	Crude oil	Gasoline	Gas and fuel oil
First half	178	42	80
Second half	68	3	37

Harry H. Smith Dies of Heart Disease in Chicago, While Attending Convention

Harry H. Smith, secretary and counsel of the Mid-Continent Oil and Gas Association, was found dead in bed in his hotel room in Chicago Saturday afternoon, June 17. He had been dead several hours, a victim of heart trouble.

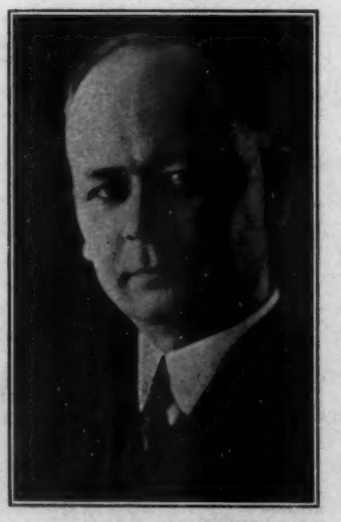
Mr. Smith, who was a representative of the Mid-Continent Oil and Gas Association at the meeting of oil producers held in Chicago for the purpose of formulating a code of fair competition under the provisions of the industry recovery act, left Tulsa with a party of oil producers and company executives on Wednesday, and attended the Thursday and Friday meetings of the oil men held in the Stevens Hotel. When his absence from Saturday's session was noted, C. C. Herndon, vice president of the Skelly Oil Co., and Alvin Richards, counsel for the Pure Oil Co., both Tulsa men, investigated and, finding Mr. Smith's room door locked, notified the hotel authorities and soon after the discovery of Mr. Smith's body was made.

J. D. Collett, general president of the Mid-Continent association, delegated Mr. Herndon and Mr. Richards to accompany the body to Tulsa.

The meeting of oil men in Chicago paid their long-time friend and associate a silent tribute while all stood, and a committee was appointed to draw up resolutions of respect and condolence.

Harry H. Smith was one of the most valuable men the oil industry had among its number. He had been secretary of the Mid-Continent Oil and Gas Association since 1919. He was chosen for his fine legal mind, his long-known integrity and his expertness in all matters dealing with taxes. Thereafter there was never any question as to the secretaryship. Mr. Smith was given broad powers in the execution of his work and acquitted himself well. The depletion clause in the income tax law, which he and William N. Davis, then president of the association, fought for in Washington, was one of the early triumphs in which he shared and his valuable service in the interests of oil men every year of his secretaryship gave him a very high reputation among oil men, for, while Mr. Smith was in the employ of an association, the results of his work were beneficial to member and nonmember alike. However much the oil industry has been taxed, it would have been burdened much more had it not been for the work of Harry H. Smith and the association he represented.

Mr. Smith was born in Nashville, Ill., 53 years ago. He graduated with highest honors from the law school of Washington University in St. Louis in 1906 and moved soon after to Oklahoma where he settled in Taloga, Dewey County, in the western part of the state. He served a term as county judge. Mr. Smith came to Tulsa in 1917.



HARRY H. SMITH

Mrs. Smith and two daughters, Jane Gale and Helen Harriett survive.

The funeral was held Tuesday, June 20. Services were conducted in Trinity Episcopal Church and burial was in Rose Hill Cemetery in Tulsa.

SHELL IOWA FIELD LINE

LAKE CHARLES, La., June 19.—An 18-mile pipe line from the Iowa field, docking facilities, and a number of storage tanks are being contemplated by the Shell Petroleum Corp. for its tank farm site 11 miles south of Lake Charles. The tentative plans would call for an expenditure of about $250,000.

A permit to lay the pipe, and telephone line along it, was granted by the Calcasieu Parish policy jury. Permit for construction of the docks will be applied for through the War Department.

EXTEND GATHERING LINE

SHREVEPORT, La., June 19.—Standard Pipe Line Co. has right of way cleared, pipe strung, and is ready to start ditching for approximately 10 miles of 4-inch line into the Converse Field of Sabine Parish, Louisiana. It will be an extension of the company's gathering system in Zwolle Field of the same parish to the vicinity of Evans Brothers' No. 1 Cranford in Section 20-9-13, whence gathering lines will be extended to the other five producers in the field.

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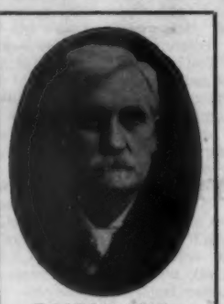

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Better Days

The oil conference at Chicago did just like Congress; it approved a program parts of which were unpalatable to many but with the mental reservation that it would be up to the President.

No other interpretation can explain the seeming unanimity given to the code of fair competition adopted. It is hardly possible, in the light of past utterances, that men with so sharply diverging views could have agreed upon such terms if they believed their action final.

Nevertheless, a beginning has been made, a good beginning because sufficient support was shown behind enough of the code to assure a working basis even though there are sections that may be modified or held in reserve in the actual application.

Congress and the country have approved the granting of unprecedented powers to the President in the belief that they were needed to get out of the depression, that the President probably will never have to use all of them and that, if the experiment does not work, Congress can recall the power it has delegated.

The conference of oil producers met in exactly the same spirit. Voluntary co-operation had failed; state co-operation was unsatisfactory; some sort of federal control seemed to many the only way out. Other industries were willing to take the chance, why not oil?

There were obvious dangers and disadvantages in government intervention but could they be worse than actual conditions? Could a federal "partnership" be worse than dictatorship by bootleggers and price cutters?

The code approved at Chicago would, if applied strictly, clamp the oil industry in a straitjacket. Wildcatting would be "verboten" unless a permit was secured from the President. Yet it is said "wildcatting should not be prohibited because the future maintenance of the petroleum supply depends upon future discoveries of new pools."

The provision that "when a new discovery is made there should be no further drilling in that pool until a plan for the development thereof shall have been approved by the President" would seem to offer sufficient protection against a new flood of unneeded oil.

But if the code can be started and gives promise of results it need not be rigid. Unworkable or unnecessary conditions can be dropped; necessary additions can be made as need develops.

The big thing at Chicago was that 95 per cent of the industry could be got to agree upon a code after frank discussion, that these 500 representatives of practically every opinion in the producing industry realized the time has come for common action for the rehabilitation of the oil business.

There is every indication that the President meant exactly what he said when he spoke of a partnership rather than a dictatorship. Industries everywhere are being invited and given time to frame their own codes of fair competition for approval by the President.

The greater the unanimity behind a code the more likely it is to be accepted, if it shows genuine fairness towards competitors and to consumers. The oil code, in the main, does this. Such criticism as may arise is directed towards its effect on the industry as a whole.

But leaving aside for the moment what it may do to the industry let us assess what it is hoped to do for the industry.

In his message approving the industry recovery act the President said that no business which depends for its existence on paying less has any right to continue in this country. A business which can only exist by throat cutting competition has no business in business. It is a menace to honest industry, legitimate trade and good citizenship.

In the oil industry overproduction of crude, stimulated by false legal conceptions, offered the incentive for price cutting. Excessive taxation on gasoline invited evasion and gave the price cutter a margin to work with.

Add to these a flood of "hot oil" illegally produced in excess of the allowable and sold for what it would bring and the whole market structure of the industry was forced down to that level.

Here, surely, is an industry that fits into the picture drawn by the President as an illustration of the need for a law that will protect industry against unfair competition.

If the President's purposes are fulfilled in the oil industry production will be limited to market demand at a fair price, those elements "who can exist only by paying less" will be driven out by inability to obtain below cost crude and distress or tax evaded gasoline.

The foundation of the market structure will be a crude price that will return a fair profit to the producer protected against the competition of bootlegging and tax evading products.

That is the basic principle of the industry recovery law, a check on sub-normal competition, assuring every industry a legitimate starting point. Competition must be fair, or it cannot compete.

The theory is simple; the application will be difficult. Even where a code is agreed upon the details may develop innumerable differences.

These cannot be laid on the White House doorstep. They must be dealt with by the industry itself. But they need not be made more formidable than they actually are by hairsplitting. On the matter of price the injection of differences in details of accounting might prolong controversy indefinitely. But it should be a comparatively simple process if the generally accepted criterion of value recognized by the industry in the past should be continued.

It is not assumed that the President or his representative will attempt to fix a price arbitrarily without reference to the actual market. Presidential price fixing, if adopted, will probably concern itself with minimum and maximum, leaving the operations of the industry to function normally between extremes.

In fact, unless all indications are mistaken, the federal administration will simply police industry, leaving industry free to pursue its operations within the law without interference. And just as the law-abiding citizen feels no constraint from the police if industry sticks to fair competition it need not be disturbed.

But racketeers, bootleggers and tax evasionists must keep off the beat. Prevention of overproduction will remove their temptation and eliminate their opportunity. That, at least, is the hope held out. Unless it is realized the whole plan must fail and the consequences of failure should make failure impossible.

Whatever may be thought of the principle, however the details of the code may be ironed out, the whole industry, like its representatives at Chicago, should take hold with every intention of giving it every support in the strong hope that it will mean better days in the oil industry and in all business.

5 ESSENTIALS

IN THE ECONOMICAL AND EFFICIENT CONSTRUCTION AND OPERATION OF GAS LINES

HERE are modern Couplings, Clamps, and Sleeves that appeal to the practical gas man. Simple in design . . . they are the development of the world's largest and oldest builder. Easily and quickly installed, they save considerable time and expense in the construction, extension, replacement and repair of gas lines and mains. Flexibility and permanent tightness are attested by nearly half a century of performance records. Write for prices.

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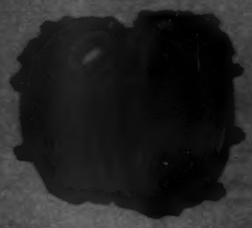
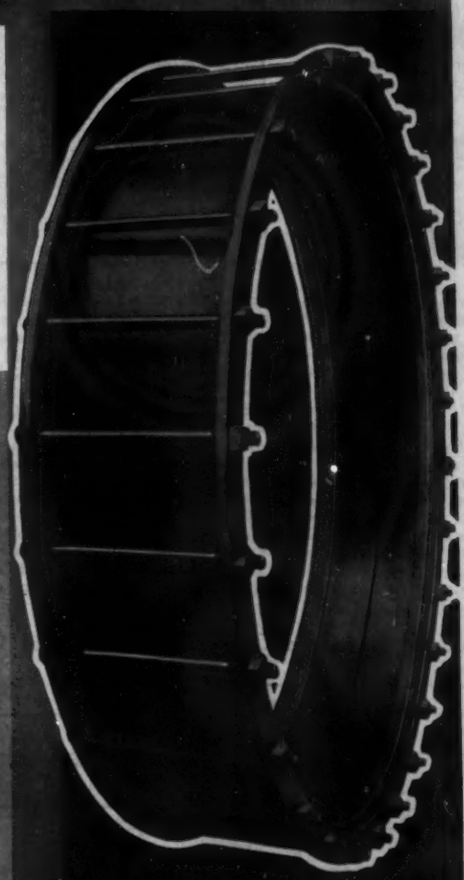
Dresser Cast Split Sleeves, Style 55, will enclose and permanently repair broken bell-and-spigot joints. Rubber sole-and-end gaskets, specially designed and compounded, simplify the installation and insure permanence.

Dresser Bell Joint Clamps, Style 43-B.P., offer an effective and permanent means of repair for all bell-and-spigot joints.



Dresser rubber-packed Split Sleeves, Style 57, will enclose and permanently repair leaks, breaks and splits in the straight sections of cast-iron pipe. Single-unit Sleeve has an inside clearance of 3/4" between end gaskets. Two or more units may be joined together.

Dresser Cast Couplings, Style 53, can be furnished for A.G.A. cast-iron pipe up to and including 30-inch. (For larger sizes, Style 38 Steel Couplings are used.)



Dresser Steel Couplings, Style 38, are standard for all kinds and sizes of plain-end pipe: steel, cast-iron, etc., from 3/4-inch to the largest pipe produced.

DRESSERS!

Rapid Advance in Oklahoma Gasoline Market Continues With Other Products Stronger

By C. O. WILLSON

Tank car quotations on all grades of gasoline continued their spectacular rise over the past week in Oklahoma and all other Mid-Continent refining centers.

With an almost day to day advance, the low octane U. S. Motor gasoline in the Oklahoma market reached a low of 3¾ cents on Tuesday with similar advances in other grades of refinery gasolines. This was an increase of 1 cent per gallon for the seven-day period. Several of the larger refiners in the State had advanced their low price to 4 to 4¼ cents with the higher octane material nominally quoted at 5 cents or more. The more optimistic were predicting an advance to a low for all grades of 5 cents by the end of the week or the first of July.

The price advances in natural gasolines were even more sensational. This product which sold in substantial quantities under 1 cent per gallon early in June had advanced to a low of 2¾ cents on Tuesday for the 26-70 grade. Sales of the lower vapor pressure grades were reported as high as 3½ cents with quotations up to 4 cents.

Among the other products, kerosene and distillate advanced from one-eighth to one-fourth cent per gallon. Refiners generally were refusing to part with the industrial grades of fuel oil and gas oil and these products also were quoted at higher levels. Lubricants were steady with advances in cylinder stocks expected to be effective before the end of the month.

The rapid recovery in the Mid-Continent refinery markets over the past two weeks admittedly has a speculative background with the real test of the price improvement to come within the next month. An advance of approximately 100 per cent in posted crude oil prices during the week, an increase in gasoline service station schedules with the expectation of additional increases together with a general optimism regarding improvement in business conditions have caused sellers to restrict their sales and has brought additional buying in the market in the expectation of higher prices. Several refiners are pursuing a policy of keeping their quotations on most products higher than the going market and in that manner are restricting the movement from their refineries to contracts and regular customers. Many of the smaller refiners including those in East Texas who sell the bulk of their output on the spot market are sold up for the month on orders placed early in June and are refusing to consider July business at this time.

"A substantial recovery in Mid-Continent refinery tank car, particularly gasolines, is an entirely logical development," said one veteran marketer in summarizing developments since the first of June. "The ridiculous levels to which markets were allowed to fall earlier in the year discounted the worst possible developments for the oil business generally. Even if the general recovery in the oil business is slow refinery prices should be advanced to higher levels and permit the refining and marketing branches to offset the unsatisfactory conditions of the past two years." This view is representative of many sellers.

Suggest Caution

Other observers were of the opinion that the advance in Mid-Continent refinery prices would shortly be stopped and further increases would await developments of a general nature in the oil business. The increases in spot gasoline prices have been much more rapid in the Mid-Continent than in competitive areas although a general tightening in prices was reported this week from all areas including the West Coast. Present spot prices in Oklahoma now are on a parity with the prevailing Gulf Coast market for domestic and foreign movement and are only slightly lower than the Pennsylvania prices. Normally due to differences in freight rates and market conditions the Gulf Coast and Pennsylvania prices are from 1½ to 2½ cents higher than the Oklahoma market. In the past this narrowing of price differentials between these refining groups has often resulted in the dumping of excess supplies in the territory normally served by Oklahoma and other Mid-Continent refiners bringing in a reactionary market. While that development is not considered probable at this time a general price advance in competitive areas would materially strengthen the present position of the Mid-Continent market.

Another development needed to support the present tank car prices in the Mid-Continent is higher levels for gasoline tank wagon and service station schedules throughout the Middle West. One-half cent of the 2-cent advance which became effective the past week was due to the increase in the Federal tax from 1 to 1½ cents. This left a net advance of 1½ cents per gallon. This was a material aid to a large group of Mid-Continent

Refined Market Barometer

Increases in gasoline tank car prices were reported in all the principal refining centers in the United States for domestic movement over the past week with practically no change in export quotations. The Mid-Continent led these advances with the largest increases. Natural gasolines also advanced sensationally in the Mid-Continent and East. Kerosenes were reported both dull and strong in the several groups with prices either unchanged or higher. Fuel oils firm with prices generally unchanged and the same situation applied to gas oils. Lubricants steady. No important changes in wax.

Mid-Continent—Refinery gasolines and natural gasolines advance rapidly. Kerosene and distillate prices fractionally higher. Fuel oil and gas oil prices higher, when any changes were made. Lubricants and wax firm.

East Coast—One-half cent advance in gasoline tank car prices. Kerosene steady. Other products unchanged.

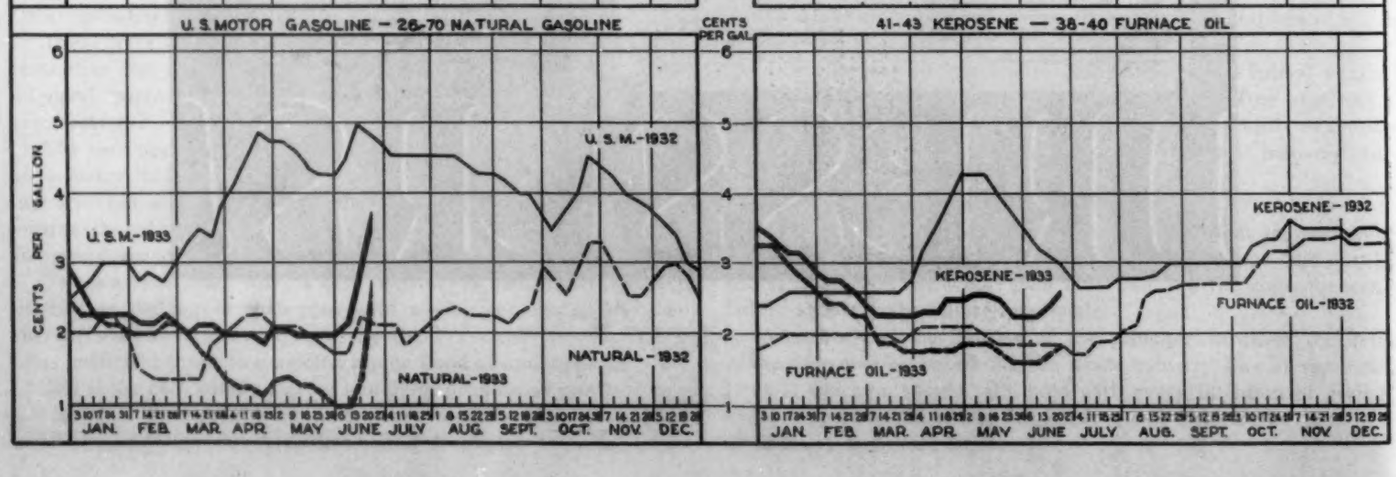
Chicago—Prices generally higher on all products with greatest advance in gasolines.

Pennsylvania—Gasoline and naphtha prices higher. Other products unchanged.

Gulf Coast—Gasoline prices higher on all grades for domestic movement. High viscosity neutral oils higher.

California—Gasolines stronger for domestic movement.

Representative Mid-Continent Quotations on Crude Oil and Refined Products Basis Oklahoma (Group 3)



refiners who sell the bulk of their gasoline to jobbers on long-time contracts in which they guarantee the buyers 5 cents or more per gallon spread between the delivered tank car and service station prices. Following the drastic reductions in gasoline tank wagon and service station prices made effective by the Standard Oil Co. (Indiana) last month these contracts in many cases netted the refiners at their plants less than 1 cent per gallon.

This means that even with the 1½-cent advance in tank wagon and service station schedules the net return at refineries is 2½ cents per gallon or less. In order to justify present posted schedules for crude oil, greater yields on the contract material are necessary and additional advances of at least 2 cents per gallon are hoped for by Mid-Continent refiners in the near future. It is predicted, however, that the new policy will be to maintain narrow margins between Middle West service station and Mid-Continent tank car prices and those who have guaranteed long margins will continue to have a relatively low net return at their plants. A policy of cancelling these long margin contracts has been recommended as the only possible way out for many refiners.

Crude Oil Situation

The third factor pointing to caution at this time is the crude oil situation. While posted prices were advanced the past week those in touch with this situation state that further increases or the maintenance of present schedules is contingent on a reduction in production to current requirements. When the posted prices were 25 cents per barrel previous to last week, purchases in excess of current requirements were attractive to many large and small buyers who carried on storage programs. This buying coupled with a refusal of many producers to sell largely accounted for the strength in the crude market which brought the higher posted prices. With posted prices of 50 cents or higher this speculative buying may decrease in volume and bring about a condition again in which the spot prices in the field will be lower than the posted schedules. It is pointed out in this connection that while the large allowable in East Texas was officially decreased last week by the Texas Railroad Commission, production is still being maintained at previous levels. One major producing and purchasing company in meeting the advances in posted crude oil schedules pointed to this situation and stated the continuance of the higher price was dependent on a reduction in total production so that storage programs were no longer necessary.

With these conditions in mind market students are inclined to place considerable stress on the final outcome of the code meeting held last week by the producing branch and that to be held this week by the refining and marketing branches. The goal of these meetings is to work out an effective method of curtailing crude oil production and establish a code in marketing which will do away with all of the disastrous marketing practices which have resulted in large losses in that branch of the business.

Refiners who sell to jobbers on the spot market were having many complaints from the latter that in paying the higher prices for the low and middle octane gasolines they had very little margin left to cover marketing costs. The 1-cent advance in Standard of Indiana tank wagon and service station prices Wednesday improved this situation but jobbers were expected to reduce their spot purchases to a minimum. In some cases they are buying from other jobbers who are protected with contracts giving them a guaranteed margin under the service station prices.

Resale low octane U. S. Motor gasoline was available on an Oklahoma basis as low as 3½ cents on Monday and Tuesday although as previously explained a majority of the sellers were asking a low of 3¾ cents. Spot trading was dull in all grades. The interrefinery buying which was an important factor in the market earlier in the month has slowed up. The middle octane motor was selling at a low of 4 cents with several refiners asking a minimum of 4½ cents. The top bracket gasoline for which there is limited demand was quoted over a price range of 4¼ to 5 cents.

Refiners offering 400 and the lower point gasolines of higher gravity than U. S. Motor in all cases so far as known made the same advances as they did in the U. S. Motor grades. There was practically no spot trading in the higher gravity gasolines. Naphthas were advanced 1 cent a gallon during the week.

Natural Gasoline

Manufacturers had little difficulty in boosting their prices on the various grades of natural gasoline from day to day. Three or four Oklahoma manufacturers are listed among the active buyers and with many manufacturers sold up for the month little material is being offered on the spot market. Scattered cars offered are quickly absorbed by refiners, jobbers and export buyers.

A low of 2¾ cents was established for the 26-70 grade on Tuesday. There was considerable difference of opinion as to the going market for the lower vapor pressure grades. Occasional sales by manufacturers who were not keeping in touch with the market from day to day were below the general quotation. Sales of 11-pound material at 3½ cents were reported with 18-55 at 3 cents.

Other Products

The advance in kerosene, distillate, gas oil and industrial fuel apparently was due more to a withdrawal from the market by refiners than any steady increase in demand. Refiners believe these products are headed for higher levels along with gasoline and are limiting their offers. Buyers appeared particularly anxious to secure prime white distillate and this price in Oklahoma moved up to a low of 2 cents with sales as high as 2¼ cents. All distillates were up one-eighth to one-fourth cent.

In Oklahoma refiners generally were asking a low of 2⅝ cents for 41-43 specification kerosene. Buying was slow. Industrial gas oils moved up to a low of one-eighth cent and industrial fuels to a low of 32½ cents. Lubricants and wax were firm but unchanged in price.

Revenue Act Makes Important Changes in Tax Free Sales of Gasoline and Oil

Effective July 1 important changes in the matter of tax-free sales of gasoline and lubricating oil under Federal law will become effective. President Roosevelt on June 16 signed the bill known as H.R. 5,040 and its provisions will become effective July 1.

One of the important changes provides that jobbers can sell gasoline and lubricating oil to municipalities, states, counties and other governmental units without paying the tax. One of the strong objections made to the law which became effective a year ago was that only producers of gasoline and oils could sell to these political subdivisions tax free. Another provision of the tax will permit refiners to sell bright stocks, neutral oils and other lubricating oils to compounders tax free. The compounders under the new law are classified as producers. The Federal Gasoline tax effective June 17 became 1½ cents instead of the previous 1 cent. The lubricating oil tax of 1 cent is unchanged.

Following are the main provisions of H.R. 5,040 which have direct application in the oil industry:

"Section 4. (a) Effective 15 days after the date of the enactment of this act, Section 620 of the Revenue Act of 1932 is amended to read as follows:

" 'Section 620. Tax-Free Sales.

" 'Under regulations prescribed by the commissioner with the approval of the secretary, no tax under this title shall be imposed with respect to the sale of any article:

" '1. For use by the vendee as a material in the manufacture or production of, or as a component part of, an article enumerated in this title;

" '2. For resale by the vendee for such use by his vendee, if such article is in due course so resold;

" '3. For resale by the vendee to a state or political subdivision thereof for use in the exercise of an essential governmental function, if such article is in due course so resold.

" 'For the purposes of this title the manufacturer or producer to whom an article is sold under Paragraph 1 or resold under Paragraph 2 shall be considered the manufacturer or producer of such article. The provisions of Paragraphs 1 and 2 shall not apply with respect to tires or inner tubes or articles enumerated in Section 604, relating to the tax on furs.'

"(b) Effective 15 days after the date of the enactment of this act, Section 601 (c) (1) of the Revenue Act of 1932 is amended by adding at the end thereof the following:

" 'Under regulations prescribed by the commissioner with the approval of the secretary, no tax shall be imposed under this section upon lubricating oils sold to a manufacturer or producer of lubricating oils for resale by him, but for the purposes of this title such vendee shall be considered the manufacturer or producer of such lubricating oils.'

"(c) Effective 15 days after the date of the enactment of this act, Section 621 (a) of the Revenue Act of 1932 is amended by inserting after Paragraph 2 thereof the following new paragraph:

" '(3) To a manufacturer, producer,

(Continued on Page 31)

American Petroleum Institute Weekly Refinery Statistics

Figures below reported for week by American Petroleum Institute. (1) Per cent refinery capacity represented. (2) Daily average crude runs to stills. (3) Total motor fuel stocks. (4) Gas oil and fuel oil stocks. All figures in 42-gallon barrels.

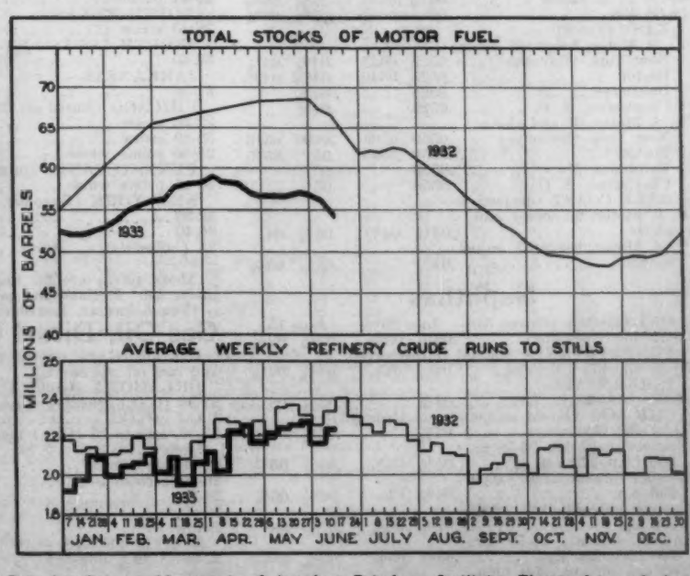
Week Ending June 17, 1933, Compared to Week Ago

	Week Ending June 17, 1933				Week ending June 10, 1933			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
East Coast	99 1	489,000	15,708,000	7,176,000	99.1	472,000	16,252,000	6,854,000
Appalachian	95.0	91,000	1,982,000	862,000	95.0	81,000	1,997,000	880,000
Ind., Ill., Ky. ..	97 5	338,000	7,516,000	3,978,000	97.5	310,000	7,976,000	3,970,000
Okla., Kans., Mo.	84.9	244,000	4,595,000	3,631,000	84.9	234,000	4,773,000	3,333,000
Inland Texas ...	56 4	95,000	1,489,000	2,179,000	56.4	90,000	1,526,000	2,224,000
Texas Gulf	97 7	445,000	5,631,000	6,239,000	97.7	426,000	5,463,000	6,466,000
Louisiana Gulf..	97 3	113,000	1,650,000	1,900,000	97.3	112,000	1,302,000	1,877,000
N. La. and Ark..	88.5	43,000	247,000	530,000	88.5	32,000	253,000	606,000
Rocky Mtn.	90 8	43,000	1,159,000	656,000	90.8	42,000	1,205,000	677,000
California	94.6	438,000	13,602,000	98,537,000	94.6	464,000	13,900,000	99,179,000
Total U. S. ...	91.6	2,344,000	53,579,000	126,468,000	91.6	2,253,000	54,647,000	125,070,000

Total motor fuel stocks Bureau of Mines basis 55,400,000 bbls.

Week Ending June 17, 1933, Compared to Year Ago

	Week Ending June 17, 1933				Week Ending June 18, 1932			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
East Coast	99 1	489,000	15,708,000	7,176,000	100.0	490,100	19,297,000	6,998,000
Appalachian	95.0	91,000	1,982,000	862,000	91 8	98,300	2,331,000	1,053,000
Ind., Ill., Ky. ..	97 5	338,000	7,516,000	3,978,000	93.9	297,600	8,346,000	4,065,000
Okla., Kans., Mo.	84.9	244,000	4,595,000	3,631,000	89 6	236,300	5,377,000	3,384,000
Inland Texas ...	56 4	95,000	1,489,000	2,179,000	....	132,000	1,841,000	2,924,000
Texas Gulf	97 7	445,000	5,631,000	6,239,000	99.8	459,900	6,269,000	7,340,000
Louisiana Gulf..	97 3	113,000	1,650,000	1,900,000	100.0	122,900	1,967,000	4,275,000
N. La. and Ark..	88.5	43,000	247,000	530,000	....	53,700	197,000	756,000
Rocky Mtn.	90 8	43,000	1,159,000	656,000	89.4	32,800	1,881,000	679,000
California	94.6	438,000	13,602,000	98,537,000	86.7	462,300	16,525,000	98,024,000
Total U. S. ...	91.6	2,344,000	53,579,000	126,468,000	95.1	2,405,900	64,031,000	129,898,000



Data based on weekly reports of American Petroleum Institute. Figures for week just ended not shown in graph but are included in accompanying table

REFINERY AND CRUDE PRICES

Quotations on refined products are for interstate or export movement except as otherwise noted

EXCLUSIVE OF TAXES

The following quotations are exclusive of the Federal excise taxes of 1½ cents a gallon on gasoline and 4 cents on lubricating oils, which became effective June 17, 1933.

Refinery Gasolines

OKLAHOMA (Group 3)—	June 20		June 13	
*U. S. Motor grades:				
Regular	.04	.04¼	.03	.03¼
Premium	.04¼	.04½	.03¼	.03½
Third grade	.03¾	.04	.02¾	
60-62 400 grades:				
Regular	.04½	.04⅝	.03½	.03¼
Premium	.04⅝	.04½	.03⅝	.03½
Third grade	.03⅞	.04	.02⅞	.03
64-66 390	.04	.04½	.03	.03½
64-66 375	.04½	.04¾	.03½	.03¼
68-70 350	.04¼	.04½	.03¼	.03½
NORTH TEXAS—				
U. S. Motor grades:				
Regular	.04		.03	.03¼
Premium	.04¼		.03¼	.03½
Third grade	.03¾	.04	.02⅝	.02¾
60-62 400	.03⅞	.04	.02¾	.03
64-66 390	.04	.04½	.02⅞	.03
64-66 375	.04½	.04¾	.03	.03½
64-66 360	.04¼	.04½	.03	.03⅛
†NORTH LOUISIANA—				
U. S. Motor grades:				
Regular	.04½	.04¼	.03⅛	.03¼
Premium	.04¾	.04½	.03¼	.03½
Third grade	.03⅝	.04	.02¾	.03
60-62 400	.03⅞	.04	.02⅞	.03⅛
†ARKANSAS—				
U. S. Motor grades:				
Regular	.04	.04¼	.03½	.03¼
Premium	.04¼	.04½	.03⅝	.03½
Third grade	.03¾	.04	.02¾	.03
CHICAGO (Based on Oklahoma Group 3)—				
U. S. Motor grades:				
Regular	.04		.03	.03¼
Premium	.04¼		.03¼	.03½
Third grade	.03⅝		.02¾	.02⅞
60-62 400	.03⅞		.02⅞	.03
64-66 375	.04		.03	.03½
68-70 360	.04½		.03½	.03¼
Aviation fighting grade	.04¼		.03¼	.03½

*Octane Ratings—The following octane ratings apply to the three grades of U. S. Motor gasoline: Regular 60-64 octane number; premium, 65 and above octane number; third grade, 59 and below octane number. Octane ratings determined by C.F.R. Motor Method.

†For Arkansas, Louisiana and Mississippi delivery.

PENNSYLVANIA (inland refineries)—				
U. S. Motor	.04¾	.05	.04½	.04⅝
60-62 400	.04⅞	.05⅛	.04⅝	.04¾
64-66 375	.05	.05¼	.04¾	.04⅞
68-70 350	.05¼	.05½	.04⅞	.05⅛
CALIFORNIA (domestic movement)—				
54-58 U. S. Motor	.05½	.06½	.05¼	.06½
58-60 400	.06	.06¾	.05¾	.06¾
EAST COAST—				
U. S. Motor, below 65 octane:				
New York (Bayonne)	.0525	.0535	.04¾	.04⅞
Boston	.0525	.0540	.0465	.0475
Baltimore	.0525		.04¾	
Charleston, S. C.	.0525		.04¾	
U. S. Motor, 65 and above:				
New York (Bayonne)	.0550	.0565	.0490	.0515
Boston	.0550	.0565	.05	.0515
Baltimore, Md.	.0550		.05	
Charleston, S. C.	.0550		.05	
GULF COAST (domestic)—				
U. S. Motor, 65 octane and above	.04¼	.04½	.03¾	.04
U. S. Motor, below 65 octane number	.04		.03¼	.03½

Naphthas

OKLAHOMA (Group 3)—	June 20		June 13	
50-52 450 (blending)	.03½	.03¾	.02½	.02¾
PENNSYLVANIA (inland refineries)—				
50-54 430-450 (blending)	.04½	.04¾	.04¼	.04½
†ARKANSAS—				
48-50 (blending)	.03½		.02¾	.03
CHICAGO (Based on Oklahoma Group 3)—				
50-52 450 (blending)	.03¾		.02½	.02⅝
Cleaners' naphtha, 56-58 gr. 200 i.b.p.-320 e.p.	.05½	.05¾	.05¼	.05½
Lacquer diluent, 180 i.b.p. 250 e.p.	.06¾	.07	.06½	.06¾
Lacquer diluent, 140 i.b.p.-200 e.p.	.07⅞	.08¼	.07½	.08
Rubber solvent, 68-70 gr., 100 i.b.p.-300 e.p.	.05½	.05¾	.05¼	.05½
Stoddard solvent, 300 i.b.p.-410 e.p., over 83° flash	.05	.05¼	.04¾	.05
Pet. thinner, 290-300 i.b.p.-415 e.p., over 83° flash	.04¾	.05	.04½	.04¾
V.M.&P. naphtha, 56-58 gr., 190-200 i.b.p.-330 e.p.	.05¼	.05½	.05	.05¼
Petroleum spirits	.04¼	.04½	.04	.04¼

Natural Gasolines

OKLAHOMA (Group 3)—	June 20		June 13	
Grade 18-55	.03	.03¼	.01¾	.01⅞
Grade 26-70	.02¾		.01⅝	.01½
Grade 30-70	.02⅝		.01⅝	
*Low pressure grades:				
15 lb. v.p. (max.)	.03¼	.03½	.02	.02⅛
11 lb. v.p. (max.)	.03½		.02⅝	.02¾
NORTH TEXAS—				
Grade 18-55	.03		.01¾	
Grade 26-70	.02⅝	.02¾	.01⅝	.01½
Grade 30-70	.02⅝		.01⅝	
*Low pressure grades:				
15 lb. v.p. (max.)	.03	.03¼	.02	
11 lb. v.p. (max.)	.03¼	.03½	.02⅝	
NORTH LOUISIANA—				
Grade 26-70	.02¾		.01¾	
CALIFORNIA—				
75-78 375	.03¾	.04¼	.03¾	.04¼

Kerosenes

(All kerosenes water white)

OKLAHOMA (Group 3)—	June 20		June 13	
41-43	.02⅝	.02¾	.02⅜	.02⅝
42-44	.02¾	.03	.02⅝	.02¾
NORTH TEXAS—				
40-41	.02½		.02¼	
41-43	.02½	.02⅝	.02⅜	.02½
†NORTH LOUISIANA—				
41-43	.03		.02¾	.03
42-44	.03¼		.02½	.03⅛
†ARKANSAS—				
41-43	.03		.02⅞	.03
PENNSYLVANIA (inland refineries)—				
45	.04		.04¼	.04½
46	.04⅛		.04¼	.04⅜
47	.04⅜		.04⅜	.04½
CHICAGO (Based on Oklahoma Group 3)—				
41-43	.02½	.02¾	.02½	.02¾
42-44	.02¾	.03	.02¾	.03
*CALIFORNIA—				
38-40 high burning test	.03½	.04¼	.03½	.04¼
NEW YORK (Bayonne, N. J.)—				
41-43	.05	.05¼	.04¾	.05¼
GULF COAST (domestic)—				
41-43 water white	.03¾	.04	.03¾	.04

*For Pacific Coast consumption.

†For Arkansas, Louisiana and Mississippi delivery.

Furnace Oils and Tractor Fuels

OKLAHOMA (Group 3)—	June 20		June 13	
32-36 straw	.01⅞	.02	.01¾	.01⅞
36-38 straw	.01¾	.01⅞	.01⅝	.01¾
38-40 straw	.01⅞	.02	.01¾	.01⅞
39-41 prime	.02⅛	.02¼	.01⅞	.02
NORTH TEXAS—				
38-40 straw	.01⅞	.02	.01¾	.01⅞
†NORTH LOUISIANA—				
36-40	.02½	.02¾	.02¼	.02½
†ARKANSAS—				
32-36	.02½	.02⅝	.02⅜	.02½
CHICAGO (Based on Oklahoma Group 3)—				
32-36 straw	.01⅞	.02	.01⅝	.01¾
38-40 straw	.01⅞	.02	.01⅝	.01¾
38-40 prime white	.02	.02⅛	.01¾	.02
PENNSYLVANIA (inland refineries)—				
40-41 prime white	.03	.03⅛	.03	.03⅛
NEW YORK (Bayonne, N. J.)—				
32-36	.04		.04	
36-40	.05		.05	
21 (industrial)	.03½		.03½	

Above prices are for distillate oils of zero cold test under 190° F. flash and good odor.

†For Arkansas, Louisiana and Mississippi delivery.

Gas Oil, Diesel Oil and Fuel Oil

Gas oil (G.O.) quoted per gallon basis; Diesel oil and fuel oil per barrel.

OKLAHOMA (Group 3)—	June 20		June 13	
32-36 (G.O.) cracking stock	.01⅛	.01¼	.01	.01⅛
U.G.I. (G.O.)	.01⅛	.01¼	.01	.01⅛
32-36, zero to 15 (G.O.) high flash	.01⅛	.01⅜	.01⅜	.01½
28-30, zero to 10	.62½	.67½	.60	.65
26-30, zero to 10	.60	.65	.55	.60
24-26	.45	.50	.40	.45
20-22	.40	.45	.35	.37½
Below 16	.32½	.37½	.30	.35
NORTH TEXAS—				
32-36 (G.O.) industrial	.01⅛		.01	
22-26	.45	.50	.40	.45
Below 20	.40	.45	.35	.40
†NORTH LOUISIANA—				
32-36 (G.O.) zero	.02¼		.02	.02¼
14-16	.35		.35	
†ARKANSAS—				
30-32 (G.O.) zero	.02¼		.02¼	
14-16	.35		.35	
CHICAGO (Based on Oklahoma Group 3)—				
32-36 (G.O.) industrial	.01	.01¼	.00⅞	.01⅛
28-30 (zero)	.62½	.65	.60	.65
26-28 (zero)	.55	.60	.55	.60
22-26 (zero)	.50	.55	.50	.55
18-22 (zero)	.45	.47½	.42½	.47½
Below 18	.37½	.40	.37½	.40

Note: Fuel oils of more than 40 cold test generally 5 to 15 cents per barrel less in all areas than shown in above tables.

†For Arkansas, Louisiana and Mississippi delivery.

PENNSYLVANIA (inland refineries)—				
36-40	.03¼		.03¼	
CALIFORNIA—				
30-34 (G.O.) per bbl.	.80	.90	.80	.90
27 plus Diesel	.75	.85	.75	.85
15-19 bunker (at tidewater)	.50	.60	.50	.60
15-19 (cargo lots)	.45	.55	.45	.55
15-19 (tank cars)	.35	.50	.35	.50
GULF COAST—				
28-30 (G.O.)	.02⅝	.02⅞	.02⅝	.02⅞
28-30 Diesel	1.50		1.50	
Bunker C (bulk cargoes)	.50	.55	.50	.55
Bunker C (bunkers)	.65		.60	.65
NEW YORK (Bayonne, N. J.)—				
28 plus (G.O.)	.04		.04	
*28-30 Diesel	1.65		1.65	
26-30 Diesel (tank cars)	.04		.04	
‡Bunker C	.70	.75	.70	.75

*Lighterage 6½ cents per barrel.

†Lighterage 5 cents per barrel.

‡Contract price at New York Harbor to ocean-going steamships only.

Petroleum Coke*

Prices per ton f.o.b. refineries in Chicago area.

Breeze (screenings)	4.50	4.50
Still runs	5.50	5.50
Lump and egg	6.50	6.50

*Refineries will absorb freight to 80 cents a ton.

Neutral Oils

(Viscosity at 100° F. and color)

OKLAHOMA (Group 3)—	June 20		June 13	
Zero to 10 Cold Test:				
150-3	.06¼	.06½	.06¼	.06½
180-3	.07½	.07¾	.07½	.07¾
180-4	.07¼	.07½	.07¼	.07½
200-3	.08	.08¼	.08	.08¼
200-4	.07¾	.08	.07¾	.08
240-3	.10	.10¼	.10	.10¼
240-4	.09¾	.10	.09¾	.10
280-3	.11	.11¼	.11	.11¼
280-4	.10½	.10¾	.10½	.10¾
300-3½	.11¼	.11½	.11¼	.11½
350-3½	.11¾	.12	.11¾	.12
400-4	.12¼	.12½	.12¼	.12½
500-4½	.12¾	.13	.12¾	.13
100-2 paraffin oil	.04¼	.04½	.04¼	.04½
15-30 Cold Test:				
200-3	.07¼	.07½	.07¼	.07½
200-4	.07	.07¼	.07	.07¼
240-3	.09¼	.09½	.09¼	.09½
240-4	.09	.09¼	.09	.09¼
280-3	.10¼	.10½	.10¼	.10½
280-4	.10	.10¼	.10	.10¼
PENNSYLVANIA—				
150 vis., No. 3, 400-405:				
Zero pour test	.17½	.18	.17	.17½
10 pour test	.17	.17½	.16½	.17
15 pour test	.15½	.15¾	.15¼	.15½
25 pour test	.14¾	.15	.14½	.14¾
180 vis., No. 3, 25 pour test	.16¼	.16½	.16¼	.16½
200 vis., No. 3:				
Zero pour test	.20¼	.20½	.20¼	.20½
10 pour test	.19¼	.19½	.19¼	.19½
15 pour test	.18¼	.18½	.18¼	.18½
25 pour test	.18¼	.18½	.18¼	.18½
GULF COAST—				
Pale Oils:				
100-2-2½	.04¾	.05¼	.04¾	.05¼
200-3	.05½	.06	.05½	.06
300-3	.06¾	.07¼	.06¾	.07¼
500-3½	.08¾	.09¼	.08¾	.09¼
750-3½	.09¾	.10¼	.09¾	.10¼
1,200-3½	.12¾	.13	.12	.12¼
2,000-4	.13¾	.14	.13	.13¾
Red Oils:				
200-5-6	.05	.05½	.05	.05½
300-5-6	.06	.06½	.06	.06½
500-5-6	.07	.07½	.07	.07½

1,200-5-6	.10¾	.11	.10¼	.10¾
2,000-6 plus	.12¾	.13	.12	.12½
CALIFORNIA—				
Pale Oils:				
100-2½-3	.09	.09½	.09	.09½
200-2½-3	.09½	.10	.09½	.10
300-3-3½	.10½	.11	.10½	.11
350-3-4	.11	.11½	.11	.11½
400-3-4	.11½	.11¾	.11½	.11¾
450-3-4	.11¾	.12	.11¾	.12
550-3-4	.12	.12½	.12	.12½
Red Oils:				
200-4-5	.09½	.10	.09½	.10
300-5-6	.10½	.11	.10½	.11
350-5-6	.11	.11½	.11	.11½
400-5-6	.11½	.11¾	.11½	.11¾
450-5-6	.11¾	.12	.11¾	.12
500-5-6	.12	.12¼	.12	.12¼
600-5-6½	.12¼	.12½	.12¼	.12½
700-6½ plus	.12½	.12¾	.12½	.12¾
750-6½ plus	.12¾	.13	.12¾	.13
900-6½ plus	.13	.14½	.13	.14½

Bright and Steam Refined Stocks

OKLAHOMA (Group 3)—	June 20		June 13	
630 light green	.05½	.06½	.05½	.06½
600 light green S.R.	.05	.06	.05	.06
600 dark green S.R.	.03½	.04	.03½	.04
Bright Stocks:				
190-200 D	.19½	.20½	.19½	.20½
150-160 D, 0-10	.17¾		.17¾	
150-160 D, 10-25	.17¼		.17¼	
150-160 D, 25-40	.16¾		.16¾	
150-160 E	.15¾		.15¾	
PENNSYLVANIA—				
600 S.R.	.11¾	.12	.11	.11¼
650 S.R.	.13¾	.14	.13¼	.13½
600 Pennsylvania flash	.14¾	.15	.14¼	.14½
650 D filtered	.19¾	.20	.19	.19½
600 E filtered	.15¼	.15½	.14¾	
Pennsylvania Grade bright stock:				
No. 8 color, 145-50 vis., at 210; 540-550 flash:				
10 pour test	.23½	.24	.23½	.24
15 pour test	.21½	.22	.21½	.22
25 pour test	.20½	.21	.20½	.21

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—	June 20		June 13	
124-126 white crude scale	.02¼	.02⅜	.02¼	.02⅜
PENNSYLVANIA—				
122-124	.02⅜	.02½	.02¼	.02¼
124-126	.02½	.02⅝	.02⅜	.02⅝
NEW YORK HARBOR—				
120-122 (a.m.p. basis)	.03		.03	
125-127	.0330		.03¼	
130-132	.0370		.0370	
133-135	.0430		.0430	
135-137	.0460		.0460	
Petrolatum in barrels in carload lots:				
Dark green	.01875		.01⅞	
Amber	.02		.02	
Extra amber	.02⅜		.02⅜	
Lily white	.0550		.05½	
Snow white	.0650		.06½	
Cream	.0450		.04½	
CHICAGO (f.o.b. switching district)*—				
122-124	.0340	.0350	.0340	.0350
125-127	.0365	.0375	.0365	.0375
127-129	.0380	.0390	.0380	.0390
130-132	.0440	.0450	.0440	.0450
132-134	.0465	.0475	.0465	.0475

*Cents per pound on carlot orders in cotton lined burlap bags of 225 lbs. approx. Add 3° F. for a.m.p.

Export Prices

GASOLINE

GULF COAST—	June 20	June 13
U. S. Motor	.03½ .03¾	.03½ .03¾

60-62 400	.03625		.03¾	
61-63 390	.03625		.03¾	
64-66 375	.03875	.04	.03¾	.04
LOS ANGELES, CALIF.—				
U. S. Motor, 53-55 437 e.p.	.03¾	.04¼	.03¾	.04¼
U. S. Motor, 65 octane	.04½	.04¾	.04½	.04¾
U. S. Motor, 67 octane	.05		.05	
U. S. Motor, 69 octane	.05¼		.05½	
58-60 400 endpoint gasoline	.04¼	.05	.04¾	.05
KEROSENE				
GULF COAST—				
41-43 prime white	.0375		.03¾	
41 water white	.04		.03⅞	
LOS ANGELES, CALIF.—				
41-43 water white	.03¾	.04¼	.03¾	.04¼
LUBRICANTS				
NEW YORK (f.a.s. in bbls.)—				
600 Warren E	.22¼		.22¼	
600 S.R. unfiltered	.18½		.18½	
650 S.R. unfiltered	.20¾		.20¾	
600 flash S.R.	.21¾		.21¾	
630 flash S.R.	.26¾		.26¾	
Bright stock, No. 8 color	.27½		.27½	
Bright stock, No. 6½ color, dil.	.26½		.26½	
NEUTRALS				
NEW YORK—Pale Engine Oil, Bulk (vis. at 100)—				
230-3¾	.09¾		.09¾	
180-3¼	.09½		.09½	
100-2¼	.05		.05	
Red Engine Oil, Bulk (vis. at 100):				
300-6½	.09½		.09½	
250-6	.08½		.08½	
200-6	.07¾		.07¾	
PARAFFIN WAX (Fully Refined)				
NEW YORK (prices per pound)—				
123-125 a.m.p.	.02875		.02875	
125-127 a.m.p.	.03		.03	
130-132 a.m.p.	.03½		.0350	
133-135 a.m.p.	.04		.04	
135-137 a.m.p.	.04¼		.04¼	

Crude Oil Prices

Oklahoma, Kansas, North and East Central Texas

East Texas (see note) ..... $.50
Corsicana (heavy) (June 17, 1933)* ..... .30
Other fields ..... (See gravity table)

Note—Effective June 17, East Texas posted by Sinclair Prairie Oil Marketing Co., Stanolind Crude Oil Purchasing Co., Magnolia Petroleum Co. Effective June 19, Texas Co., Tide Water Oil Co.
*Magnolia Petroleum Co.

West Texas

Crane, Upton, Crockett, Howard, Glasscock, Mitchell, Ector, Winkler and Pecos Counties (see note) ..... $.30
Lea County, N. Mex. (June 19, 1933) ..... .30
Toborg, Pecos County (June 20, 1933)*. ..... .25
Jones and Fisher Counties. See gravity table

Note—Effective June 19, Crane, Upton, etc., posted by the Texas Co., Magnolia Petroleum Co., Gulf Pipe Line Co., Humble Oil & Refining Co. Lea County, effective June 19, Texas Co. and other purchasers.
*Shell Petroleum Corp.

Gulf Coast

Grade A and Grade B specifications discontinued by leading buyers ..... See gravity table
Tomball (June 19, 1933)* ..... $ .65
Livingston (June 20, 1933)† ..... .50
Refugio light ..... (See gravity table) (Gulf Coast)*
Refugio heavy (June 19, 1933)* ..... .45
Markham and High Island ..... (See gravity table) (Gulf Coast)
Conroe ..... (See gravity table)*

*Humble Oil & Refining Co., Markham by Texas Co., and High Island by Yount Lee Oil Co. †Shell Petroleum Corp.

South Central and Southwest Texas

Darst Creek (June 19, 1933) ..... See note
Mirando (June 19, 1933) ..... See note
Luling (June 19, 1933) ..... $ .30
Pettus (June 19, 1933) ..... .55
Salt Flat (June 19, 1933) ..... .40
Lytton Springs (June 19, 1933) ..... .45
Duval County (June 19, 1933) ..... .35
Saxet (June 19, 1933) ..... .45

Note—Darst Creek by Texas Co., Magnolia Petroleum Co., 35 cents; Gulf Pipe Line Co. and Humble Oil & Refining Co., 40 cents; Mirando, Magnolia Petroleum Co., 35 cents; Humble Oil & Refining Co., 40 cents. Pettus and Salt Flat by Humble and Gulf companies; Luling and Lytton Springs, by Magnolia Petroleum Co. Duval and Saxet, by Texas Co.

Eastern States

SOUTH PENN OIL CO.
(Effective June 17, 1933)

Pennsylvania Grade Oil in National Transit Lines (Bradford Field) $1.47
Pennsylvania Grade Oil in Southwest Pennsylvania Lines 1.17
Penna Grade Oil in Eureka Pipe Line Lines 1.12
Penna Grade Oil in Buckeye Pipe Line Lines ..... .97
Corning Grade Oil in Buckeye Pipe Line Co.'s lines (June 19, 1933) .... .60
Ragland Grade Oil in Cumberland Pipe Lines (Kentucky) (Jan. 16, 1931) .... .60

PENNZOIL CO.
(Effective June 17, 1933)

Pennsylvania Grade Oil in National Transit Lines:
Group A $1.42
Includes Cochran, Franklin, Hamilton and Doolittle districts.
Group B 1.41
Includes Titusville district.
Group C 1.40
Includes Turkey and Tidioute districts.
Group D 1.39
Includes Bear Creek and Porkey districts.
Group E 1.37
Includes Eldenau, Bull Creek, Rough Run, Carbon, Dipner, Bredin, McJunkin, Jameson, Kennerdell, Emlenton, Tiona, Lacy and Kinzua districts.
Price depends on length of pipe line haul to plant at Oil City.

TIDE WATER PIPE CO.
(Effective June 17, 1933)

Bradford, Pa. $1.47
Allegany, N. Y. 1.47

PURE OIL CO.
(Effective June 17, 1933)

Cabin Creek, W. Va. $1.12
Bradford Hollow, W. Va. 1.12
Kelly's Creek, W. Va. 1.12

North Louisiana and Arkansas

Smackover, Ark. (all grades) ..... See note
Urania, La. (Jan. 20, 1933) ..... $ .25
East El Dorado, Ark. (Jan. 20, 1933) .. .. See note
Other fields ..... See gravity table

Note — Smackover, all grades, effective June 19 by Texas Co., 30 cents; June 19, Standard Oil Co. of Louisiana, 30 cents; Magnolia Petroleum Co., 30 cents; Gulf Refining Co., 20 cents; Louisiana Oil Refining Corp., 25 cents. Urania Field posted by Louisiana Oil Refining Co. and H. L. Hunt, Inc., East El Dorado, effective January 20, Magnolia Petroleum Co., 20 cents; Gulf Refining Co., 20 cents.

Rocky Mountain States

Iles, light (June 17, 1933) ..... $ .40
Iles, heavy (June 17, 1933) ..... .34
Fort Collins, Wellington and Greasewood, Colo., are on contract basis.
Florence (May 6, 1933) ..... .35
Dutton Creek, Wyo. (June 17, 1933) .. .34
Frannie, light (June 17, 1933) ..... .31
Frannie, heavy (June 17, 1933) ..... .20
Salt Creek and La Barge (June 17, 1933) ..... .30
See Stanolind Mid-Continent price schedule
Big Muddy (June 17, 1933) ..... .45
Grass Creek (June 17, 1933) ..... .62
Grass Creek, heavy (Dec. 15, 1932) .... .45
Elk Basin, light (June 17, 1933) ..... .62
Lance Creek (Dec. 16, 1932) ..... .92
Poison Spider (Mar. 5, 1931) ..... .70
Hudson (June 2, 1931) ..... .65
Lander (Mar. 5, 1931) ..... .40
Rex Lake (Feb. 25, 1930) 1.10
Osage (Jan. 18, 1933) ..... .52
Lost Soldier (Apr. 12, 1932) ..... .80
Hamilton Dome (Dec. 16, 1932) .. .. .35
Torchlight (June 17, 1933) ..... .62

(Continued on Page 26)

Crude Oil Prices in Kansas, Oklahoma, Texas, Louisiana and Arkansas

	Oklahoma, Kansas, North, Central and East Central Texas	North Louisiana and Arkansas	Gray County, Texas	Gray County, Texas	Carson and Hutchinson Counties, Texas	Carson and Hutchinson Counties, Texas	Conroe, Texas	Conroe, Texas	Gulf Coast, Texas	Gulf Coast, Texas	Caddo, Louisiana	Homer, Louisiana	Haynesville, La.	Sabine, DeSoto, Carterville, Sarepta	El Dorado, Arkansas
Degrees of gravity—	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Below 20	...	...	...	...	...	...	...	...	$0.32	$0.32	...	...	...	...	...
20-20.9	...	...	...	...	...	...	...	...	.34	.34	...	...	...	...	...
21-21.9	...	...	...	...	...	...	...	...	.36	.36	...	...	...	...	...
22-22.9	...	...	...	...	...	...	...	...	.38	.38	...	...	...	...	...
23-23.9	...	...	...	...	...	...	...	...	.40	.40	...	...	...	...	...
24-24.9	...	...	...	...	...	...	...	...	.42	.42	...	...	...	...	...
Below 25	*$0.20	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	*.22	...	...	...	...	...	...	...	.44	.44	...	...	...	...	...
26-26.9	*.24	...	...	...	...	...	...	...	.46	.46	...	...	...	...	...
27-27.9	*.26	...	...	...	...	...	...	...	.48	.48	...	...	...	...	...
28-28.9	*.28	...	...	...	...	...	...	...	.50	.50	...	...	...	...	...
Below 29	.28	$0.28	...	...	...	...	...	...	...	...	$0.26	$0.32	$0.29	$0.35	$0.37
29-29.9	.30	.30	...	...	...	...	...	...	.52	.52	.28	.34	.31	.37	.39
30-30.9	.32	.32	...	...	...	...	...	...	.54	.54	.30	.36	.33	.39	.41
31-31.9	.34	.34	...	...	...	...	...	...	.56	.55	.32	.38	.35	.41	.43
32-32.9	.36	.36	...	...	...	...	...	...	.58	.56	.34	.40	.37	.43	.45
33-33.9	.38	.38	...	...	...	...	...	...	.60	.57	.36	.42	.39	.45	.47
34-34.9	.40	.40	...	...	...	...	...	...	.62	.58	.38	.44	.41	.47	.49
Below 35	...	...	$0.34	...	$0.29	...	...	...	...	...	...	...	...	...	...
35-35.9	.42	.42	.36	$0.30	.31	$0.20	$0.59	$0.49	.62	.59	.40	.46	.43	.49	.51
36-36.9	.44	.44	.38	.32	.33	.22	.61	.60	.62	.60	.42	.48	.45	.51	.53
37-37.9	.46	.46	.40	.34	.35	.24	.62	.61	.62	.61	.44	.50	.47	.52	.55
38-38.9	.48	.48	.42	.36	.37	.26	.65	.62	.62	.62	.46	.52	.49	.55	.57
39-39.9	.50	.50	.44	.38	.39	.28	.67	.63	.62	.63	.48	.54	.51	.57	.59
40 and over	.52	.52	.46	.40	.41	.30	.69	.64	.62	.64	.50	.56	.53	.59	.61

Column 1—Effective June 17, Sinclair Prairie Oil Marketing Co., Stanolind Crude Oil Purchasing Co., Magnolia Petroleum Co., Continental Oil Co. Effective June 19, Empire Oil & Refining Co. Effective June 17, in Oklahoma alone, Barnsdall Refineries, Inc., Mid-Continent Petroleum Corp., Pure Oil Co., Deep Rock Oil Co., Globe Oil & Refining Co., Golden Rule Refining Co., Tide Water Oil Co. Effective June 17, in Kansas alone, Skelly Oil Co., Dickey Refining Co., Eldorado Refining Co., Derby Oil Co., Kanotex Refining Co. Effective June 19, Gypsy Oil Co. in Oklahoma and Kansas and Gulf Pipe Line Co. in Texas; Carter Oil Co. in Oklahoma and Humble Oil & Refining Co. in Texas; Texas Co. in Oklahoma and Texas. Effective June 20, Shell Petroleum Corp. in Kansas and Oklahoma. Effective June 17, H. F. Wilcox Oil & Gas Co. in Oklahoma.
Column 2—Texas Co., effective June 19. For Standard of Louisiana prices see Columns 11 to 15.
Column 3—Humble Oil & Refining Co. and Gulf Pipe Line Co., effective June 19.
Column 4—Sinclair Prairie Oil Marketing Co., effective June 17, and Texas Co., Magnolia Petroleum Co., H. F. Wilcox Oil & Gas Co., Phillips Petroleum Co., effective June 19.
Column 5—Humble Oil & Refining Co. and Gulf Pipe Line Co., effective June 19.
Column 6—Sinclair Prairie Oil Marketing Co., effective June 17. Texas Co., Magnolia Petroleum Co., Phillips Petroleum Co., effective June 19.
Column 7—Humble Oil & Refining Co., effective June 19.
Column 8—Texas Co. and Tide Water Oil Co., effective June 19.
Column 9—Sinclair Prairie Oil Marketing Co., effective July 17. Humble Oil & Refining Co. and Gulf Pipe Line Co., effective June 19.
Column 10—Texas Co., effective June 19.
Columns 11, 12, 13, 14 and 15—Standard Oil Co. of Louisiana, effective June 19.

(California Crude Oil Prices on Page 26)

TANK WAGON MARKETS

Quotations for gasoline and kerosene in United States, as furnished by the larger marketing concerns, include taxes

June 20, 1933

Taxes

The gasoline quotations given in the following tables include the 1½-cent Federal tax effective June 17, 1933, as well as state, county and city taxes. The gasoline quoted is the regular or standard grade. In most marketing areas a third or competitive grade is generally available at 1 or more cents per gallon under the service station price for the regular grade. Ethyl Gasolines are sold 2.5 to 3 cents above the service station price for the regular grade.

Southern District

STANDARD OIL CO (KENTUCKY)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Atlanta, Ga. ..	19.0	19.0	7.0	10.0
Augusta	19.0	19.0	7 0	9.0
Macon	19.0	19.0	7.9	13.0
Savannah	19 0	19.0	7.0	14.0
Birm'ham, Ala..	21.0	21.0	8.0	11.0
Mobile	17.0	17.0	8.0	8.0
Montgomery ..	22.0	22.0	8.0	14.0
Jackson, Miss. .	16.0	16.9	7.0	12.0
Vicksburg	16.0	16.0	7.0	12.0
Jack'ville, Fla..	19 0	19.0	8.0	12.5
Miami	19.0	19.0	8.0	12.0
Pensacola	19.0	19.0	8.0	14.0
Tampa	19.0	19.0	8.0	10.0
Lexington, Ky..	18.5	18 5	6.0	10.0
Covington	17.0	17.0	6.0	11.5
Louisville	16.0	16.0	6.0	10.9
Paducah	19.0	19.0	6.0	9.0

In addition to the state tax of 4 cents on gasoline, Montgomery has city and county tax of 2 cents on gasoline and one-half cent on kerosene. Kerosene prices in Georgia include 1-cent tax. In Florida, an inspection fee of 0.125 cent; in Alabama, an inspection fee of one-half cent on kerosene and one-fortieth cent on gasoline. To Pensacola, Montgomery and Birmingham state taxes add 1-cent city tax. To Mobile state tax add 1-cent city tax. Dealers receive discount of 2 cents off tank wagon price throughout territory.

Southwestern District

MAGNOLIA PETROLEUM CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Dallas, Tex. ...	13 0	15.5	5.5	7 5
Fort Worth ...	13 0	15 5	5 5	7.5
Houston	13.0	15 5	5.5	8.0
San Antonio ...	13 0	15.5	5.5	8 0
El Paso	13 0	15 5	5.5	8.0
Texarkana ....*	14 5	14 5	5 5	†11.0
Muskogee	12.0	14.5	5 5	6.5
Okla. City	12 0	14.5	5.5	8 0
Tulsa	13.0	15 5	5 5	8.0
Ft. Smith, Ark.*	14 9	14 9	5 5	†9.0
Little Rock ...‡	17.4	17.4	7.5	†10.0

*Less 2½ cents to dealers. †Less 2 cents to dealers. ‡Less 4½ cents to dealers.

Standard Oil Co. (Indiana)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Chicago	13 6	13.6	4 5	8 0
Decatur, Ill ...	14 0	14 0	4 5	8.5
E. St. Louis ...	14 3	14.3	4.5	7 8
Joliet	14 0	14 0	4.5	8 5
Peoria	14 0	14.0	4 5	8.5
Quincy	13.8	13.8	4 5	8.3
Davenport, Ia. .	14.1	14 1	4 5	8.6
Des Moines ...	14.1	14 1	4 5	8 6
Mason City ...	14.1	14 1	4.5	8.6
Sioux City	13.7	13.7	4 5	8 2
Duluth, Minn. .	14.7	14 7	4 5	8 8
Mankato	14 3	14.3	4.5	8 8
Minneapolis ...	14.4	14.4	4 5	8 9
LaCrosse, Wis..	15 8	15 8	5.5	9.3
Green Bay	15 2	15 2	5.5	8 7
Milwaukee	14.7	14.7	5 5	8.2
Madison	14 9	14 9	5.5	8.4
Detroit, Mich. .	14.5	14.5	4 5	9 0
Grand Rapids .	14 2	14.2	4 5	8 7
Saginaw	14 5	14.5	4 5	9.0
Evansville, Ind.	15.0	15.0	5.5	8 5
Indianapolis ...	15 2	15.2	5.5	8 7
South Bend	15.5	15 5	5.5	9 0
Fargo, N. Dak..	16 1	16.1	4.5	10.6
Huron, S. Dak..	16 3	16.3	5.5	9 8
Sioux Falls ...	15 8	15 8	5.5	9 5
K. C. Mo.* ...	13 2	13.2	4.5	7.7
Springfield* ...	13 1	13.1	4.5	7 6
St. Louis	12.2	12 2	4 0	7 2
St. Joseph* ...	12.8	12 8	4.5	7.3
Wichita, Kans.	13.1	13 1	4.5	6.6
Bartlesville, Ok.	13.0	16.0	5.5	7.8

***State tax 3 cents, 1-cent city tax and 1-cent Federal tax.**

Effective June 1, 1933—Discounts off tank wagon price to consumers on 500 gallons or more per month in territory outside of Chicago metropolitan area: 2 cents on Ethyl and Red Crown gasolines, and 1 cent on Stanolind gasoline. One-half cent additional discount in Chicago division.

Effective July 1, 1933—Discounts on resellers authorized agent's agreement made off the service station price throughout the territory as follows: 2.5 cents on Red Crown Ethyl and Standard Red Crown gasolines, and 1.5 cents on Stanolind gasoline. Half of reduction from normal service station price shall be absorbed by reseller up to maximum of 1 cent on all grades.

Stanolex Furnace Oil in Chicago

Effective April 28, 1933, prices f.o.b. Chicago, tank wagon prices: No. 1 (36-40 lt. stw. zero), 400 gallons or more, 6¼ cents; No. 2 (30-34 stw. zero), 100 gallons or more, 5¾ cents; No. 3 (22-26 zero), 100 gallons or more 5¼ cents; No. 4 (12-16 zero), 300 gallons or more, 4½ cents. Viscosity of No. 4, 90-115 at 100° F.; No. 5, 4 cents; for less than specified quantities, add 1 cent.

Fuel Oils

Associated Distributors Prices

Spot market prices on 350 gallons or over deliveries, and top prices on contracts, respectively: 38-40, 6¼ and 7¼ cents; 32-36 light, 5¾ and 6¾ cents; 32-36 dark, 5¼ and 6¼ cents; 28-30, 4½ and 4¾ cents; 24-6, 4¾ and 5¾ cents; 18-22, 4 and 4½ cents. On deliveries of less than 350 gallons the spot price is one-half cent higher.

Naphtha

	Tank Wagon	Tank Car
Oleum spirits	10.7	6.23
V.M.&P. naphtha	12.7	6.73
Cleaners' naphtha	13.0	9.23
Stanisol	13.0	9.23

Tank wagon prices f.o.b. Chicago, January 6, 1932. Each of above prices subject to discount of 1 cent per gallon for 150-gallon lots if covered by contracts.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Denver, Colo. ..	14.0	16.0	5.0	11.0
Pueblo	14.0	16.0	5.0	12.5
Grand Jnctn. ..	16.0	18.0	5.0	14.5
Casper, Wyo. ..	15.0	17.0	5.0	10.0
Cheyenne	14.0	16.0	5.0	12.5
Butte, Mont. ..	20.0	22.0	6.0	17.0
Billings	20.0	22.0	6.0	15.5
Great Falls	20.0	22.0	6.0	17.0
Helena	20.0	22.0	6.0	17.0
Salt Lake, Utah	16.0	18.0	5.0	16.0
Albu'que, N. M.	14.0	17.0	*7.0	12.0
Boise, Idaho ..	20.0	22.0	6.0	18.0
Twin Falls	20.0	22.0	6.0	18.0

***One-cent city tax.**

Effective June 1, 1933, dealers and lease and license accounts will receive 2½ cents discount on regular gasoline in Montana, Colorado, Wyoming, Utah and Idaho.

Central South District

STANDARD OIL CO. (LOUISIANA)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
N. Orleans, La..	17 8	18 8	*7.5	†11.0
Baton Rouge ..	17.0	18 0	6 5	†10 0
Alexandria	17.9	18.9	7.5	†8 5
Lafayette	18 1	19 1	7 5	†10 0
Lake Charles ..	18.0	19 0	7 5	†10.0
Shreveport	15.5	16 5	6.5	†11 0
Knoxville, Tenn.	21.2	23.2	8.5	12 5
Memphis	19 6	20 6	8 5	10.9
Chattanooga ...	20 9	21.5	8 5	10 0
Nashville	20 5	21.5	8 5	10.0
Bristol	21.1	22.1	8 5	13 0
Lt. Rock, Ark..	16.9	19.9	8.5	10.0

***Includes city tax of 1 cent. †Louisiana kerosene prices include 1-cent state tax. New Orleans kerosene price also includes 1-cent city tax.**

Effective June 2, 1933, station price fixed at 7 cents above basic tank car price at key refining points in territory. Discount to cash customers 2 cents off station price. Commercial consumers for tank wagon delivery pay following amounts over tank car price basis yearly deliveries:

1,000 to 75,000 gallons	2.5
75,000 to 300,000 gallons	1.5
Over 300,000 gallons	1.0

Nebraska

STANDARD OIL CO. (NEBRASKA)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Omaha	15.3	16.3	5.5	8.0
McCook	16 8	17.8	6 5	8 5
Norfolk	16 8	16 8	6 5	8.5
N. Platte	16 8	17 8	6 5	9.0
Scottsbluff	16.8	17.8	6.5	9.5

Note — Dealers' discount allowed on follows: Red Crown Ethyl, 2 cents off station price; Red Crown, 2½ cents off normal service station price; Nebraska Blue (third grade), 1 cent off normal service station price.

Atlantic Coast District

STANDARD OIL CO. (NEW JERSEY)

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Atl'tic City, N.J.	17.2	18.2	4.5	11.2
Newark	16.4	17 4	4 5	8 5
Annapolis, Md..	17 8	18 8	5 5	9.0
Baltimore	17 3	18.3	5 5	8.0
Cumberland ...	18.8	19.8	5 5	11 7
Wash'g'n, D. C.	15 5	16.5	3.5	10 0
Danville, Va. ..	19 9	20 9	6 5	9.9
Norfolk	18 4	19.4	6 5	10 3
Petersburg	19 2	20.2	6.5	11.4
Richmond	18 8	19.8	6 5	10 7
Roanoke	20.0	21 0	6 5	11 0
Charle's'n, W.Va.	18 2	19 2	5.5	11 6
Parkersburg ...	17.5	18.5	5.5	10 2
Wheeling	18.2	19.2	5 5	11 2
Charlotte, N. C.	21 6	22 6	7.5	12.5
Hickory	21 9	22.9	7 5	12 7
Mt. Airy	21 9	22.9	7.5	12.8
Raleigh	21 4	22 4	7.5	12.3
Salisbury	21.7	22.7	7 5	12 6
Charleston, S.C.	19 4	20 4	7.5	10 3
Columbia	21.2	22.3	7.5	12.2
Spartanburg ...	21.6	22.6	7.5	12.5

Note—Dealer contracts for gasoline are written at 2½ cents over the posted tank car price. A 2-cent discount allowed for cash at all service stations. Kerosene 1 cent off tank wagon for 25 gallons or more under contract except New Jersey and Baltimore, Md.

Pennsylvania-Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Incl'ds tax of	Kero. tank wagon
Pittsburgh, Pa..	14.5	15 5	4 5	9.5
Philadelphia ...	14.5	15.5	4 5	9.0
Scranton	14 5	15 5	4 5	9 0
Allentown	14.5	15.5	4 5	9 0
Altoona	14.5	15.5	4 5	9.5
Erie	14 5	15 5	4 5	9 5
Dover, Del. ...	14 5	15.5	4.5	9 0
Wilmington ...	14.5	15.5	4.5	9 0
Springf'd, Mass.	17.1	18.1	4.5	8 0
Worcester	17 0	18 0	4 5	8 0
Boston	16 5	17 5	4 5	8.0
Providence, R.I.	15.5	16.5	3.5	8 0
Hartford, Conn.	15 9	16.9	3.5	8.0
New Haven ...	15.7	16.7	3.5	8.0

Discount schedule effective November 1, 1932. In Delaware and Pennsylvania, 2 cents off station price on purchases of 2,000 gallons or more per month, in remainder of territory 1 cent. Wholesale discount 2½ cents per gallon on monthly deliveries of 30,000 to 100,000 gallons, 2 cents on 100,000 to 300,000 gallons, and 3½ cents on more than 300,000 gallons.

New York and Part of New England District

STANDARD OIL CO. (NEW YORK)*

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Albany, N. Y. .	16 6	17 6	4.5	9 0
New York	12.5	15.5	4.5	8.0
Buffalo	17.5	18.5	4 5	9.0
Rochester	17 7	18 7	4 5	9 0
Syracuse	17 3	18.3	4 5	9 5
Boston, Mass. .	16.5	17.5	4.5	8.0
Augusta, Me. .	18 0	19.0	5.5	9 0
Manch'tr, N. H.	18 7	19 7	5.5	8.0
Burlington, Vt..	19.3	20.3	5.5	8.5

***Discount schedule to commercial accounts are as follows: At service stations, 1 cent per gallon; tank wagon deliveries up to 20,000 gallons monthly, 2 cents per gallon; 20,000 to 100,000 gallons, 2½ cents; 100,000 to 300,000 gallons, 3 cents; 300,000 gallons and up, 3½ cents.**

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA*

	Gasoline: Tank truck†	Gasoline: Posted retail	Gasoline: Incl'ds tax of	Kero. tank wagon
Fresno, Calif. .	20.0	18.5	4.5	14 0
San Francisco .	19 5	18.0	4.5	12 5
Los Angeles ..	18.5	17 0	4 5	12 5
Reno, Nev.	22 0	21.5	5 5	15.5
Portland, Ore. .	22 5	21 0	5.5	12.5
Seattle, Wash. .	22.5	21 0	6.5	13.5
Tacoma	22 5	21 0	6 5	13 5
Spokane	25.5	24.0	6 5	18.0
Phoenix, Ariz. .	19.0	20.5	6.5	‡16.0

***Retail prices posted by Standard Stations Inc., a subsidiary.**

†Above prices are at company's plant or depots as company does not operate stations. A 4-cent per gallon discount is given dealers and customers taking tank wagon lots except in Phoenix where the discount is 1 cent. ‡Includes 5-cent state tax.

Ohio

STANDARD OIL CO. (OHIO)*

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Ohio points ...	18.5	*19.0	5.5	12.9

***Two-cent discount allowed for cash.**

Canada*

IMPERIAL OIL, LTD.
Imperial 3-Star Gasoline

	Gasoline: Tank wagon	Gasoline: Service station	Gasoline: Inc'lds tax of	Kero. tank wagon
Hamilton, Ont..	22.5	25 5	6 0	15.5
Toronto, Ont. .	22.5	25.5	6 0	15.5
Brandon, Man...	29.0	32.5	7.0	17.5
Winnipeg, Man.	26.0	29.5	7.0	17.5
Regina, Sask. .	29 0	33 0	8.0	21.5
Saskatoon, Sask.	31.0	35.0	8.0	23.5
Edmonton, Alta.	29 5	33.5	8 0	22.5
Calgary, Alta..	26.0	30 0	8.0	19.0
Vancouver, B.C.	26.5	29 5	7.0	22.5
Montreal, Que. .	22 0	25.0	6.0	15.0
St. Johns, N.B. .	24.5	28 5	7.0	20.5
Halifax, N.S. ..	23.5	27.5	6.0	20.5

***Imperial gallon used in Canada.**

TANK WAGON CHANGES

(Regular grade gasoline and kerosene)

Effective June 17 major distributors in all areas advanced gasoline tank wagon and service station prices one-half cent due to increase in Federal tax from 1 to 1½ cents per gallon.

Standard Oil Co. of Nebraska, effective June 16, advanced gasoline tank wagon and service station prices one-half cent in Nebraska.

Standard Oil Co. (Indiana), effective June 16, advanced gasoline tank wagon and service station prices one-half cent at normal points throughout entire territory.

Standard Oil Co. of New York, Standard Oil Co. of New Jersey and Standard Oil Co. of Louisiana, effective June 19, advanced gasoline tank wagon and service station prices one-half cent in their territories.

Standard Oil Co. of Ohio, under new marketing policy effective June 13, established retail service station price of 18¼ cents. Effective June 17 this was advanced to 19 cents, one-half cent being due to increased Federal tax.

Atlantic Refining Co. advanced gasoline tank wagon and service station 1 cent in Pennsylvania and Delaware, one-half cent being due to increase in Federal tax.

Magnolia Petroleum Co., effective May 5, established gasoline tank wagon price of 11½ cents and service station price of 14 cents at Muskogee, Okla.; effective June 2 established gasoline tank wagon and service station prices of 14.4 cents at Fort Smith, Ark., and 16.9 cents at Little Rock, Ark.

Standard Oil Co. of California and Standard Stations, Inc., effective June 9, advanced gasoline tank wagon and retail prices 1 cent at Portland, Ore.

Effective June 21, the Standard Oil Co. (Indiana) advanced the gasoline tank wagon and station prices 1 cent at all points in its marketing territory. Also, a half-cent increase is effective on that date on retail sales of kerosene and Stanolex fuel oils. These prices are not carried in the accompanying table since the change will not be made until Wednesday.

GAS MEN GET MEDALS

PITTSBURGH, Pa., June 19.—F. F. Schauer, vice president and general manager, Equitable Gas Co., recently presented National Safety Council President's medals to James K. Finn, clerk, East End meter shops, Equitable Gas Co., and Joseph Zavalydriga, foreman, McKeesport division, Equitable Gas Co.

The prompt action on the part of Mr. Finn in applying the Schafer prone pressure method of resuscitation on Miss Sarah Brady saved her from death from drowning at a summer camp near Harmarville, Pa. Elizabeth Levkulich, age 9, of McKeesport, Pa., fell into the river from a barge on which she was playing and Mr. Zavalydriga worked for 20 minutes over the child before she began to breathe.

NEWS FOR PETROLEUM REFINERS

Canfield Company to Make Improvements at Corapolis Plant

The Canfield Oil Co. will let contracts this week which will enlarge and improve the distillation equipment at its Corapolis, Pa., refinery. The improvements will represent an expenditure in excess of $100,000.

A new tube still is to be erected for the purpose of distilling and fractionating Pennsylvania grade crude oil with which the refinery operates exclusively. The still equipment will include convection and radiant tube banks with two towers, new pump house and control board. Fourteen run-down tanks will be erected. Other equipment includes electrically-driven rotary type transfer pumps and steam pumps to handle charging operation.

The still will have a capacity of 1,200 bbls. daily when operated to obtain 150 viscosity oils and 1,500 bbls. daily with 85 viscosity oils. The first tower will be used in the manufacture of gasoline and solvents in addition to the lubricants. The second tower will be independent of the first and will be used in the manufacture of several grades of naphtha. The second tower is provided with a steam heated reboiler.

The Canfield company is one of the oldest refining and marketing organizations in the Pennsylvania Field. Louis Carruth is president of the company, Charles McLean, vice president, H. M. Carruth, secretary and Louis W. Hodous, chief engineer.

CREDIT GROUP TO MEET

Rules of procedure to govern the activities of the Committee on Credit Practices of the Division of Marketing, American Petroleum Institute, will be discussed at a meeting of the committee to be held in the offices of the Institute on June 30, it has been announced by M. L. Gosney, chairman of the committee recently appointed by W. T. Holliday, chairman of the division. In his call for the meeting Mr. Gosney told the members the session likely will continue through July 1. The committee likewise will formulate plans for organizing subcommittees in territories conforming to the regions of the American Petroleum Institute code committees. Mr. Gosney invited members who cannot attend the New York meeting to submit recommendations regarding the number of individuals to be appointed on the subcommittee and to submit the names of oil credit men in their territories who may be expected to take an interest in the activities of the committee.

INDEPENDENT OPERATING PLANT

The refinery at Laurel, Mont., now owned by the Independent Refining Co., has started operations after being reconditioned following a shut down of approximately three years. The plant was formerly owned by the Laurel Oil & Refining Co.

The plant will be operated on a basis of 2,000 to 3,000 bbls. daily. Crude oil is being secured from the Dry Creek and Soap Creek Fields in Montana and the Elk Basin and Oregon Basin fields of northern Wyoming. The refinery will produce gasoline, kerosene, road oil, distillate and fuel oil. Distribution will be confined largely to Montana. H. T. Smart is superintendent of the refinery and P. A. Thomson, traffic manager.

East Texas Crude Analyses Show Little Variation in Refining Properties

A study of this entire series of East Texas crude oil analyses just released by the Bureau of Mines shows that there is very little variation in either the physical or chemical properties of the samples. All are classed as "intermediate base" crude oils. The gravities range from 38.6 to 41.5 degrees A.P.I. with an average of 39.9 degrees A.P.I. The sulphur content varies from 0.19 to 0.33 per cent and averages 0.25 per cent. The viscosity at 100° F. ranges from 39 to 47 seconds and averages 41 seconds. The pourpoints of the crude oil vary from 25° to 50° F. The gasoline and naphtha contents range from 35 to 37.1 per cent and average 35.9 per cent. The color of the oil is uniformly greenish black. A summary of a typical analysis follows:

	Per cent	Sp. gr.	° A.P.I.	Viscosity
Light gasoline	14.3	0.678	77.2	
Total gasoline and naphtha	35.9	.729	62.6	
Kerosene distillate	9.3	.813	42.6	
Gas oil	15.0	.846	35.8	
Nonviscous lubricating distillate	9.4	0.862–0.882	32.7–28.9	50–100
Medium lubricating distillate	6.4	.882– .894	28.9–26.8	100–200
Viscous lubricating distillate	0.0	....	...	Above 200
Residuum	21.5	0.955	16.7	
Distillation loss	2.5			

The East Texas Field, located in Rusk, Gregg, Cherokee, Smith and Upshur Counties, is the largest oil field that has been discovered in the United States, according to the Government's report. The proved area contains approximately 107,500 acres on which were 10,006 producing wells May 1, 1933, drilled to an average depth of 3,625 feet. The potential possibilities of the wells in this field are tremenrous, and an ultimate recovery of approximately 2,000,000,000 bbls. of oil has been estimated. The Bureau of Mines has collected samples of crude oil from representative wells since the field first began to produce.

The discovery well was completed in the Woodbine sand by C. M. Joiner on October 3, 1930, at a depth of 3,592 feet, with an initial production of 400 bbls. per day. In December, 1930, the second well, approximately 10 miles north of the discovery well, was completed with an initial production of 15,000 bbls. per day. The third well, located about 14½ miles northeast of the second completion, came in on January 26, 1931, producing oil at the rate of 10,000 bbls. per day. Immediately, extensive drilling began in the three areas which were at first referred to as the Joiner, Kilgore and Longview Fields. Development extended these areas until they merged to form the East Texas oil field.

J. S. Welch Becomes Sales Head of Louisiana Corp.

J. S. Welch took charge of his new duties as general salesmanager for the Louisiana Oil Refining Corp. (Cities Service Co.) of Shreveport, La., June 15 as successor to C. M. Lamason, whose resignation as executive assistant in charge of refining and refinery sales became effective on that date. His entire oil experience has been in the sales division, and at the time he joined the Louisiana Oil Refining Corp. had been with the Gay Oil Co., large independent jobber, of Little Rock, Ark., in various capacities. He joined the Gay company in 1915 and rose to be secretary-treasurer. When the Louisiana Oil Refining Corp. acquired the Gay company in 1929 he was made assistant division manager in charge of the Little Rock division and became division manager in 1930. His further advancement to retail sales manager came with his transfer to Shreveport, La., in 1931.

J. S. WELCH

CALIFORNIA IMPROVEMENTS

Several improvements are under way at California refineries. The Western Oil & Refining Co. is revamping the No. 2 Jenkins cracking unit at its Wilmington refinery. Work on rebuilding No. 1 unit was completed last month.

The Monarch Refineries, Inc., is installing large condensers at its Fruitvale and Venice refineries. The Monarch company is now one of the large independent refining organizations of southern California.

At Vinvale the Rio Grande Oil Co. is installing a new fractionating column. The work at all three refineries is being done under contract by the Southwestern Engineering Corp.

START REFINERY CONSTRUCTION

HOUSTON, Tex., June 17.—Stanolind Pipe Line Co. has completed right of way for the extension of its line from Sinco on the Houston Ship Channel to Texas City, where Pan American Petroleum Co. is to erect a 25,000-bbl. refinery immediately. The Stanolind line will consist of 31 miles of 10-inch pipe. Preliminary work on the refinery, consisting of drilling of water wells, laying a spur track to the site for handling of material, and construction of temporary buildings, already has begun.

Frank A. Howard to Become President of Development Unit

Frank A. Howard will become president of the Standard Oil Development Co., effective July 1, according to an official announcement of the past week. Mr. Howard will succeed E. M. Clark for several years a prominent official of the Standard Oil Co. of New Jersey, of which the Standard Oil Development Co. is a subsidiary. Mr. Clark is retiring from active service with the company. The activities of the development company are largely confined to carrying on research and development work for the parent company.

Mr. Howard is widely known among refinery technologists. As vice president of the development company he has directed some of the most important scientific work of the oil industry concerned with the manufacture and utilization of petroleum products. In recent years he has been prominently identified with the hydrogenation work of his company.

R. T. Haslam, who has been closely associated with Mr. Howard, will become senior vice president of the development company. E. H. Barlow will be chief engineer of the company, succeeding Charles H. Haupt, who retires July 1 after serving as vice president and chief engineer. Eric Luster will become assistant chief engineer.

The recent retirements in the official staff of the Standard Oil Co. of New Jersey, operating subsidiary of the parent New Jersey company, has made possible several promotions in the refinery operating staffs. Chester F. Smith, assistant general manager of the New Jersey refineries, is to become vice president of the operating company and general manager of the New Jersey refineries. He will take the place of Frank W. Abrams, who, as previously announced, has been elected president of the company.

J. Raymond Carringer, who is now manager of the Bayway, N. J., refinery, on July 1 will become assistant general manager of the three New Jersey refineries in charge of co-ordination of refinery activities and also will serve as manager of the Bayonne works. He will be succeeded at Bayway by George N. Mettam.

Dr. N. E. Loomis manager of the technical service division of the Bayway refinery will also be assistant to Mr. Smith.

CANADIAN PETROLEUM IMPORTS

CHATHAM, Ontario, June 17.—Official figures show that imports of petroleum, asphalt and their products into Canada in April were valued at $1,645,013, as compared with a March valuation of $1,861,853. The April imports were from the following countries: the United States, 76.8 per cent; Dutch West Indies, 8.9 per cent; Peru, 7.1 per cent; Trinidad, 6.5 per cent with the remainder scattered.

Crude petroleum imports in April declined 26.7 per cent to 36,187,424 gallons from the March total of 49,336,328 gallons. The United States and Peru were the sources of supply in April.

COSDEN AWARDING CONTRACTS

The reorganized Cosden Oil Co. is letting contracts for the improvement and enlargement of the company's refinery at Big Spring, Tex. The principal improvement will consist in a new cracking unit which will be built by the Winkler Koch Engineering Co.

East Coast Gasoline Advances as Trade Prepares for Recovery in Petroleum Price Structure

By A. E. MOCKLER
New York Bureau, The Oil and Gas Journal

NEW YORK, June 19.—Effective today, leading refiners and marketers in the East Coast area put into effect an advance of one-half cent on tank car, tank wagon and service station gasoline prices. This increase makes a net markup of 1 cent in service station prices for the week, an increase of one-half cent having been made Saturday to take care of the higher Federal tax. With the signing of the industries recovery bill by President Roosevelt and the petroleum industry prepared to take full advantage of it, East Coast oil interests believe their market is on the threshhold of a sustained recovery, and a general increase in all refined products prices is anticipated for the immediate future, based on the rising market for crude oil.

The indicated recovery in domestic oil prices will, however, react against export volume on both crude and products, it is felt here, but it is anticipated that foreign sellers will take advantage of the higher price levels in this country by raising their own quotations, and that soon a normal differential will be restored.

Refinery Gasoline

Effective today, Standard Oil Co. of New Jersey and other marketers will put into effect an increase of one-half cent on tank car gasoline quotations. This brings posted prices on regular U. S. Motor gasoline up to a range of 5.25 to 5.40 cents at leading East Coast marketing centers, with gasoline of 65 octane and above quoted at a range of 5.50 to 5.65 cents, all prices in tank car lots, f.o.b. terminals. The advance comes as a result of the firming up of the Gulf Coast cargo basis.

Recent changes in specifications for leading brands of gasoline have had interesting repercussions in the jobbing market. Whereas prior to the recent changes, U. S. Motor gasoline and high octane motor fuels were both standard articles, with the output of representative refiners interchangeable so far as jobbers' requirements were concerned, now each brand has certain characteristics peculiar to it alone. As a result, jobbers are showing more inclination to "stay put" and to concentrate on one brand, which meets with their approval and that of their customers, and fractional price differentials between the quotations of leading sellers are not expected to be reflected by the adoption of a "shopping policy" on the part of tank car buyers, as previously.

Tank Wagon Gasoline

Effective June 17, marketers advanced service station quotations one-half cent to cover the increase in the Federal excise tax, and effective today, a further half-cent advance is being put into effect, in line with the tank car advance which also becomes effective today. The Gulf Coast cargo market, which determines the wholesale and retail price basis in East Coast territory, is being closely watched for further increases.

Further reports regarding the working out of the new marketing policy of some of the major companies, in leaving the posting of service station prices strictly to the individual judgment of independent station operators, indicate the plan is working out even better than its sponsors had anticipated. Posted prices show a greater degree of uniformity than for many months, and the plan has apparently smoothed the stormy waters of excessive competition and its hitherto inevitable accompaniment, price cutting.

The transformation of the extensive marketing chain of Colonial-Beacon, Standard Oil Co. of New Jersey, Standard Oil Co. of Pennsylvania, and Standard Oil Co. of Louisiana into a territory-wide chain of "Esso" stations is nearing completion. In connection with the recent revision of marketing operations by the Jersey company, it is rumored an important executive addition will shortly be made to its marketing division from the ranks of a leading subsidiary marketing organization.

Kerosene

All of the major refiners have now returned to a minimum quotation of 5 cents for 41-43 water white kerosene in tank car lots, f.o.b. refineries or terminals, and the market is now firm at a range of 5 to 5¼ cents. Demand was reported as holding up well, particularly in New England, where California kerosene is still being utilized to make up for the shortage of marketers and refiners covering that part of the East.

Quiet conditions were reported in the kerosene tank wagon market. Marketers reported getting a very good summer gallonage, and posted prices were being firmly maintained.

Fuel Oil

Strength in crude oil has brought about a firmer feeling in the bunker oil market, and the much-discussed advance in the posted price for grade "C" oil is now believed to be more imminent. The present quotation is 75 cents a barrel at principal East Coast ports, with a concession of 5 cents to contract buyers operating ocean-going vessels, which means that the net selling price in most instances is 70 cents.

Even though a higher posted price for bunker "C" oil may be established here, it is not certain yet whether the 5-cent concession will be eliminated, owing to the keen competition. It is considered likely in view of the enactment of the industries law that special concessions of this sort may be banned by the revised code of marketing practices.

Aviation Gasoline

With the vacation season getting under way, there has been a material increase in aviation activity, and demand for aviation gasoline is on the increase, with leading refiners posting 11 to 12 cents, in tank cars, f.o.b. terminals. Commercial aviation is on the increase in this territory, and several new small commercial contracts are reported, covering both gasoline and lub oils.

Gulf Refining Co. has decided to go in for aviation oil business in more aggressive fashion, and has appointed Capt. Al Williams, noted navy flyer, as the manager of its aviation sales division.

Diesel Oil

Bunkering gallonage in this oil has fallen off somewhat thus far in 1933, and while recovery in shipping is beginning to make itself evident, refiners are of the belief that their total sales figure for the year, so far as East Coast ports are concerned, will probably show a small decline from 1932.

Gas Oil

Routine trading was reported in the gas oil market but the undertone had stiffed somewhat, although refiners continued to post 4 cents for 28 gravity minimum oil, in tank car lots, f.o.b. terminals.

Furnace Oil

Markets continued quiet, both for tank car and tank wagon deliveries, and quotations are unchanged. Retail distributors of domestic heating oils have slowed down their sales campaigns for the 1933-34 heating season, following indications that a higher tank car quotation may be made effective in the fall. Thus far, the bulk of tank wagon delivery contracts for next season have been booked at last year's levels, and even one-half cent under the former quotations in some areas.

Paraffin Wax

A marked scarcity of offerings of crude scale wax was reported, and with sellers deluged with inquiries, with little if any available from the refineries, the market strengthened, with prices nominal on all melting points. A continuance of these conditions for a few weeks, it is predicted in market circles, will witness the unusual spectacle of crude scale selling on a parity with fully refined grades.

Petrolatum

While refiners continue to talk higher prices on this material, no actual increases in quotations have materialized on any of the grades. There was a heavier buying movement reported in progress for domestic shipment petrolatum last week, and buyers were evincing some interest in offerings for July-August shipment.

Lubs

Although gallonage has fallen off somewhat since the recent sharp increases in posted quotations, refiners show no inclination to lower their price views, and prices were firmly maintained on all grades of cylinder oils. Inquiry for 600 Warren E filtered oil had picked up a little and sellers were firm at 22¼ cents per gallon, in barrels, for this grade. Bright stocks were rather sluggish.

Exports and Imports of Refined Products; Receipts of California Oil in the East

NEW YORK, June 19. — Steadily strengthening markets for both crude and refined petroleum at the Gulf tended to bring about a falling-off in export demand during the week, and there were no cargo sales reported in the open market. Last reported export sales of crude oil were made at 70 cents, f.o.b. Gulf, but with East Texas crude quotations higher it was not expected additional export business could be put through much under 85 cents at the Gulf, and sellers continued withdrawn from the market, refusing to quote until the price situation shows more stability.

In the export gasoline market, refiners continued firm in their price views. U. S. Motor was quoted firm at 3½ cents, with 64-66 375 endpoint at 3¾ to 4 cents.

Petroleum Exports

The following table shows exports of principal refined petroleum products reported from the port of New York during the three weeks ended June 10 (all figures in gallons unless otherwise noted):

	Week ended		
	June 10	June 3	May 27
Gasoline	40,000	92,000	128,000
Naphtha	4,000	.....	340,000
Kerosene	20,000	2,000	147,000
Fuel and gas oil	.....	1,675,000	225,000
Lub. oil	1,550,000	725,000	2,613,000
Pet., refined	175,000	50,000	266,000
	Pounds		
Petrolatum	.....	16,000	25,000
Paraffin wax	2,200,000	1,550,000	780,000
Refined	415,000	124,000	445,000
Scale	195,000	365,000	110,000
Lub. grease	395,000	485,000	550,000

Export demand for lubricating oils was rather quiet, definite resistance having apparently developed among foreign buyers as a result of the price increase.

Imports

Imports of crude and refined petroleum at the principal United States ports for the week ended June 10 totaled 591,000 bbls., a daily average of 84,429 bbls., compared with 465,000 bbls., a daily average of 66,429 bbls. for the previous week and a daily average of 85,357 bbls. for the four weeks ended June 10. Details follow:

(Barrels of 42 gallons)

At Atlantic Coast ports—	
Baltimore	65,000
New York	367,000
Philadelphia	109,000
Others	50,000
Total	591,000
Daily average	84,429

There were no imports by way of Gulf ports during the week.

The week's imports consisted of 532,000 bbls. of crude oil and only 59,000 bbls. of fuel oil.

California Oil Receipts

Receipts of California refined petroleum at Atlantic and Gulf Coast ports for the week ended June 10 totaled 386,000 bbls., a daily average of 55,143 bbls., as compared with 258,000 bbls., a daily average of 36,857 bbls. for the previous week, and a daily average of 51,929 bbls. for the four weeks ended June 10. Details follow:

(Barrels of 42 gallons)

At Atlantic Coast ports—	
Baltimore	38,000
New York	159,000
Philadelphia	117,000
Total	314,000
Daily average	44,857
At Gulf Coast ports—	
Port Arthur	72,000
Total	72,000
Daily average	10,286
At Atlantic and Gulf Coast ports—	
Total	386,000
Daily average	55,143
Daily average four weeks	51,929

All of the arrivals at East Coast ports were of gasoline, while the cargo landed at Port Arthur was fuel oil.

At the close of the week the following cargoes of California oil were reported afloat for East Coast ports:

For Philadelphia—116,000 bbls. of gasoline on the Standard Oil Co. of California tanker W. S. Rheem.

For Chester, Pa.—117,000 bbls. of gasoline on the Sun Oil Co. tanker Sun.

For Fall River, Mass.—75,000 bbls. of gasoline and 6,000 bbls. of kerosene on the Standard Oil Co. of California tanker W. S. Miller.

Refiners Are Firmly Holding Higher Quotations; No Movement at Price Shading Basis Found

By R. C. CONINE
Chicago Bureau, The Oil and Gas Journal

CHICAGO, June 19.—Long awaited improvements in the oil business Monday were apparently making up for lost time and the trade in the Chicago district reacted surprisingly in failing to predict that such sharp advances in the refined products markets would bring about a speedy reaction downward. While there is still little to say about jobber buying on the open markets, it is very evident that refiners are holding firmly to their elevated price levels and no materials were found to be moving on a price shading basis.

The advance June 16, of a half cent in the general service station and tank wagon price structure throughout the Indiana terrritory, and larger advances in other territories, are taken as the first of many similar increases which are to follow in the wake of the gaining gasoline tank car markets. Where before the trade could merely hope for an advance in the retail markets when affairs appeared to be bettering in the wholesale markets, the trade now believes that changes in the service station and tank wagon postings can be determined almost to a day by studying the behavior of the tank car markets. It has become of much greater interest to marketers to refrain from chiselling in the tank car markets.

Advance Nearly a Cent

The gasoline tank car markets Monday showed the following advances: U. S. Motor, third grade, from a range of 2¾ to 2⅞ cents, to a low of 3¾ cents; regular grade, from a range of 3 to 3¼ cents, to a low of 4 cents; premium grade, from a range of 3¼ to 3½ cents, to a low of 4⅛ cents. Probably influence of the introduction of "Q" fluid may be seen in the narrow spreads between the different octane grades. The 60-62 400 endpoint gasoline moved up to a low of 3⅞ cents from a range 2⅞ to 3 cents; the 64-66 375 endpoint gasoline advanced from a range of 3 to 3⅛ cents, to a low of 4 cents; the 68-70 360 endpoint gasoline advanced from a range of 3⅛ to 3¼ cents, to a low of 4⅛ cents. Aviation gasoline, fighting grade, advanced from a range of 3¼ to 3½ cents, to a low of 4¼ cents. The new prices will probably spread somewhat as buying activity increases in the spot markets. However, there are many marketers and refiners who are looking for relief from exceedingly unfavorable contracts under the National Industrial Recovery act, and if these wide marginal contracts are modified or invalidated entirely, it is said generally, all of the branches of the oil business will soon be on a profit making basis.

On July 1, according to the announcement of Standard Oil Co. (Indiana), the quantity discount allowance off the service station price to resellers will be reduced to 2.5 cents on the regular and ethyl grades and 1.5 cents on the third grade throughout the territory, including the Chicago district which has heretofore enjoyed an additional 1-cent advantage for the reseller. Meanwhile, however, the Q.D.A. in Chicago is 3.5 cents, and after allowing 2.44 cents for freight, and 3.75 cents for cost of the gasoline, the cost of the gasoline laid down at the station to the jobber is 9.69 cents. With the tax of 4.5 cents the total is 14.19 cents, while the service station posting is 13.1 cents. Many marketers believe that an advance of a full cent in the service station price is due this week.

Standard Oil Co. of Nebraska has recently announced that on or before July 1, dealer margins and commissions to private drive-in service stations and AAA accounts will be reduced to the same scale as that of the Indiana company. Rentals will continue at one-half cent a gallon for leased stations.

Special Naphthas Advance Quarter

Special naphthas continued to move up with the advancing gasoline markets indicating that the troublesome competitive conditions which have kept these markets at a point near demoralization have been eliminated. One of the district refiners who has been offering the light and heavy types of paint naphthas at low prices advanced his quotations a full cent. Some improvement in demand is noted by suppliers.

Prices Monday showed the following changes: Cleaners' naphtha, advanced from a range of 5¼ to 5½ cents, to a range of 5½ to 5¾ cents; lacquer diluent, 180-250, advanced from a range of 6½ to 6¾ cents, to a range of 6¾ to 7 cents; lacquer diluent, 140-200, advanced from a range of 7½ to 8 cents, to a range of 7¾ to 8¼ cents; rubber solvent advanced from a range of 5¼ to 5½ cents, to a range of 5½ to 5¾ cents; Stoddard solvent advanced from a range of 4¾ to 5 cents, to a range of 5 to 5¼ cents; petroleum thinner moved up from a range of 4½ to 4¾ cents, to a range of 4¾ to 5 cents; V.M.&P. naphtha moved up from a range of 5 to 5¼ cents, to a range of 5¼ to 5½ cents; petroleum spirits advanced from a range of 4 to 4¼ cents, to a range of 4¼ to 4½ cents.

Distillates and Fuel Oils

While the kerosene tank car markets did not advance pricewise over last week's quotations, the distillates moved up strongly, and the nearly forgotten industrial gas oil has become momentarily unobtainable in the district. With crude prices advancing steadily and more inducement being offered to produce gasoline, most of the refiners are expected to turn their gas oil to the cracking units.

Prices Monday were changed as follows: 32-36 straw distillates, advanced from a range of 1⅝ to 1¾ cents, to a range of 1⅞ to 2 cents; 38-40 straw distillate, advanced from a range of 1⅝ to 1¾ cents, to a range of 1⅞ to 2 cents; prime white, 38-40 distillate, advanced from a range of 1¾ to 2 cents, to a range of 2 to 2⅛ cents. The 32-36 industrial gas oil advanced from a range of seven-eighths to 1⅛ cents, to a range of 1 to 1¼ cents. While there is apparently less of the 28-30 zero fuel oil being made at this time in the district, the price on this material advanced but slightly, moving up from a range of 60 to 65 cents a barrel, to a range of 62½ to 65 cents a barrel. Some 26-28 zero fuel oil was being moved at last week's low price of 55 cents, but the greater volume has shifted toward the high of 60 cents. The 22-26 zero fuel oil shows no change, and the 18-22 zero material advanced slightly to a new range of 45 to 47½ cents.

Kerosene Tank Car Markets

The kerosene tank car markets are getting little support from buying, but refiners are holding their material and buyers Monday could not get the 41-43 water white kerosene below 2½ cents, while the 42-44 water white material was firm at 2¾ cents. There is a spread of a quarter of a cent in each of these markets.

Attention on Production Code

Considerable interest is being shown in the code formulated by representatives of some 40 associations connected with the crude oil producing branch of the industry. The licensing feature of the code receives particular attention, and it is the belief of most of the marketers that the industry is on the way to cleaning its own house and laying the ground for a stable future.

Do You Remember?

From The Oil and Gas Journal Files

25 Years Ago

June 21, 1908

Dr. W. G. Hunter, reputed to have been the first man to make a "mystery" of a drilling well, is a Tulsa visitor. The well was located on the Dugan farm, southwest of Millerstown, Butler County, Pennsylvania, in 1874. It was abandoned by the crew as a dry hole, but Joseph Seep, oil purchaser in the field, learned from a German farmer, with whom he talked in the tongue of the fatherland, that the crew would be back to drill in the well as soon as the owners had "cashed in" on the bullish effect the "dry hole" would have on the crude market. Mr. Seep and his associates beat the "conspirators" to the market, but the well exercised an exciting influence on the price of oil, first as a dry hole and later when it was drilled in as a 250-bbl. well, opening a prolific pool, and depressing the price of credit balances.

The Clayco Oil & Pipe Line Co. has a well in the Henrietta Pool, Clay County, Texas, making 73 gravity "crude" oil. It is a dark amber color. It comes from pay at 1,150 feet.

The Prairie Oil & Gas Co. is expected to lay an 8-inch pipe line from Glenn Pool, Oklahoma, to New Orleans, La., and the Associated Producers (Tide Water) is surveying for a 6-inch line from Glenn Pool to the Tide Water pipe line in Illinois.

20 Years Ago

June 26, 1913

Over 100 refugees from the Tampico oil fields have arrived in New Orleans, La. Many were women and children. They were driven out by the bandits that infest the Mexican oil region.

William Haynes Rich, retired, formerly auditor of the Standard Oil Co. of New York for many years, died at his home in New York, age 78 years.

Oklahoma Independent Producers meet in Tulsa and protest against the low prices being paid for crude oil. Robert Galbreath, A. E. Watts, Frank A. Gillespie and C. J. Wrightsman are the principal speakers.

10 Years Ago

June 21, 1923

The Powell Field in Texas is regarded as "another Mexia," and fears are entertained that it may depress the price of oil before the end of summer.

The Tonkawa Pool in Oklahoma, has produced 16,164,262 bbls. in less than two years. It contains 4,080 acres and, thus far, 292 wells. One 80-acre lease has produced 13,563 bbls. per acre.

Kerbside petrol filling stations continue to agitate some Englishmen. One prominent speaker said he "viewed with horror" a new petrol station on a prominent corner.

Many Oil Associations Represented at Meeting

(Continued from Page 9)

State Oil Producers Association; C. C. Hogue, Middle Pennsylvania District Association; David B. McCalmont, Central Pennsylvania District Association; W. J. Brundred, Butler, Armstrong, and Mercer District Association; F. D. Dorn, E. C. Emery, R. W. Haskell, Bradford District Producers Association; A. E. Faine, W. Hunter Atha, H. A. Heglheimer, I. C. Grimm, Ohio Pennsylvania Grade Oil Producers Association; Howard Atha, Virgil R. D. Krikham, Oil and Gas Producers Association of Michigan; W. F. Weeks, East Texas Independent Operators Association; Tom D. Hogan, Middle West Texas Association; J. Edgar Pew, H. F. Sinclair, C. B. Ames, K. R. Kingsbury, Amos L. Beaty, American Petroleum Institute, production division; T. H. Barton, Mid-Continent Oil and Gas Association, Louisiana division; C. W. Hoffman, West Central Texas Oil and Gas Association; L. P. St. Clair, California Oil and Gas Association; A. J. Crites, Independent Oil Producers Association of California; D. C. Williams, Natural Gasoline Association of America; Ralph B. Lloyd, Oil Producers Sales Agency of California; L. A. Stigert, Public Service Commission of Kansas; and Ralph T. Zook, Pennsylvania Grade Crude Oil Association.

NATURAL GASOLINE MANUFACTURE

Mid-Continent Refinery Stocks of Natural Low

Refiners supplied with natural gasoline from Mid-Continent gasoline plants used 11.3 per cent less natural gasoline during the first four months of this year than during the same period a year ago, according to the Western Petroleum Refiners Association.

Refiners stocks at the close of the period were 39.9 per cent below those of a year ago. Stocks at natural gasoline plants in the Mid-Continent were 27.4 per cent less, but despite this favorable factor prices have remained relatively low. Some relief has been seen in the advancing market during the past week but there still appears to be an excess of production. At the end of the first four months of this year the excess production amounted to 15.8 per cent, according to the following summary of Mid-Continent natural gasoline statistics covering the two periods in question.

MID-CONTINENT NATURAL GASOLINE STATISTICS—FIRST FOUR MONTHS, 1932 AND 1933

(Quantities in thousands of gallons)

Stocks at Natural Gasoline Plants, April 30

Mid-Cont. States	First 4 mo. 1932	First 4 mo. 1933	Percentage change
Oklahoma	14,476	10,780	—25 5
Kansas	1,206	836	—30.7
Texas	12,583	8,774	—30.3
Louisiana	1,211	1,062	—12.3
Arkansas	309	164	—46.9
Total	29,785	21,616	—27.4

Production at Natural Gasoline Plants

Oklahoma City	28,300	25,360	—10.6
Osage County	16,500	13,300	—19.4
Seminole	41,900	30,800	—26 5
Rest of State	49,400	41,700	—15 6
Oklahoma total	136,100	111,100	—18.4
Kansas total	9,500	8,300	—12 6
Panhandle	60,100	54,200	—9.8
North Texas	8,700	7,000	—19.5
West Central	31,000	26,800	—13.5
Rest of State	31,600	24,100	+11.6
Texas total	131,400	112,100	—7.7
Louisiana total	17,800	13,400	—24 7
Arkansas total	6,900	5,200	—24.6
Total	291,700	250,100	—14 3

Shipments from Natural Gasoline Plants

Oklahoma	130,409	106,031	—18.7
Kansas	8,722	7,874	—9.7
Texas	114,822	109,714	—4 4
Louisiana	17,827	13,053	—26 8
Arkansas	6,793	5,200	—23 5
Total	278,573	241,872	—13.2

Stocks at Local Refineries, April 30

Okla. and Kans.	798	1,260	+57.9
Inland Texas	924	210	—77.3
Coastal Texas	13,608	7,476	—45 1
N. La. and Ark.	126	336	+166.7
Coastal La.	none	none	.....
Total	15,456	9,282	—39.9

Used by Local Refiners

Okla. and Kans.	61,036	60,984	—0.1
Inland Texas	39,648	43,554	+9.9
Coastal Texas	40,782	34,356	—15.8
N. La. and Ark.	12,600	5,796	—54 0
Coastal La.	13,042	3,570	—72 7
Total	167,118	148,260	—11.3

Local Refinery Demand (Receipts)

Okla. and Kans.	60,606	61,230	+1 2
Inland Texas	40,362	43,596	+8.0
Coastal Texas	42,924	32,634	—24.0
N. La. and Ark.	12,474	5,964	—52.2
Coastal La.	12,978	3,570	—72 5
Total	169,344	147,084	—13.1

Excess Production Over Local Refinery Demand

Okla. and Kans.	84,994	58,050	—31.7
Texas	38,114	35,870	—5.9
La. and Ark.	752	9,066	.....
Total	123,356	102,016	—15.8

Warren Petroleum Adds Pressure Tank of Unique Design at Houston Terminal

The Warren Petroleum Co. will be ready within three weeks to use its pressure storage facilities on the Houston Ship Channel for handling contract and current commitments of stabilized natural gasoline for export and coastwise movement. The company has purchased a 7-acre tract of land along the channel adjacent to the properties of the American Petroleum Co. One of the tanks now being built on this site is a 38,000-bbl. specially constructed type, capable of handling 20-pound natural gasoline without loss due to evaporation.

Because of its unusual design, considerable interest is placed in the project in addition to the fact that the Warren Petroleum Co. will place itself in a position to handle cargo shipments of stabilized natural gasoline of a wider range in volatility.

The tank has been designed to withstand 6 pounds gauge pressure in addition to the hydrostatic head. The high working pressure will be permitted through the use of a new radial cone-type top and bottom. The tank is 86 feet in diameter and is 36 feet high. The high pressure on the top and bottom of the tank will be borne by a series of radial beams running from the top of a vertical cylinder in the center of the tank out to the shell of the tank.

This divides the roof and bottom into segments which approximate long triangles. The sides of these triangles are welded to the radial beams and the plate is dished to the proper curvature to give it ample strength.

These beams are tied together, top and bottom, with vertical rods acting as stay bolts. With the natural weight of the liquid tending to bear down on the base, the pull upward of the rods holds the top beams rigid.

The design is a product of the Chicago Bridge & Iron Works, which company is also supervising its construction. All features of the tank are covered by patents issued or applied for.

In addition to the pressure range, lines are being extended from the American Petroleum Co.'s plant and loading rack to the tank, all of which will permit greater flexibility and economy in handling a much broader range of motor fuel and motor fuel blending materials.

Wisconsin Grants Permit for First Propane Plant

Permission has been granted the Wisconsin Rapids Gas Co., affiliated with the Liquefied Natural Gas Co. of Minneapolis, Minn., to construct a plant in Wisconsin Rapids, Wis., for the distribution of propane gas. The company proposes to serve the city of Wisconsin Rapids by pipe line as a public utility and to service other towns in Wood, Portage, Juneau and Waushua Counties with bottled gas.

Lee H. Barker, president of the company is contemplating ordering the start of construction work on the plant immediately. H. Henley, chief engineer, with offices in Minneapolis, Minn., has plans completed for the system.

Towns to be served with propane from the central plant include Auburndale, Siegel, Rudolph, Grand Rapids, Seneca, Cranmoor, Dexter, Port Edwards and the eastern part of Remington. The towns in Portage County to be served include Lynwood, Pine Grove, Almond, Plover and parts of Buena Vista and Carson. In Juneau County Finley and Meceda will be served while in Waushua County plans call for service in Wautoma and Coloma.

Gas of 2,550 B.t.u. will be distributed and rates have been proposed as follows:

	Per 1,000 ft.
First 1,000 cu. ft.	$1.75
Second 1,000 cu. ft.	1.50
Third 1,000 cu. ft.	1.25
Over 3,000 cu. ft.	1.00
For house heating, all consumption	.75
Monthly service charge	.75

The company has been granted the permit with the understanding the plant will be in operation by November 1.

MINNESOTA PROPANE PLANT

MINNEAPOLIS, Minn., June 19.—The Liquefied Natural Gas Co. of Minneapolis has started construction work on a central distributing plant for propane gas at Tracy, Minn. Lines will be laid for servicing the homes and truck deliveries of the bottled gas will be made to nearby towns.

Propose Natural Gasoline Plant for Michigan Field

FLINT, Mich., June 19.—The Michigan Natural Gas Corp. has prepared plans for the building of a natural gasoline plant in the Chippewa-Greendale fields of Michigan as part of the company's program for supplying natural gas to a number of communities in Michigan.

Mr. Sarkisson, president of the company, stated construction of a gas pipe line from the Broomfield Pool in Isabela County would be started soon and that negotiations are under way for the delivery of natural gas to the city gates at Saginaw, Bay City, Flint and Pontiac.

At first the company proposes to deliver the dry gas produced in the Broomfield area, which is said to be capable of producing 100,000,000 feet per day.

Then, approximately 25,000,000 feet of gas will be available as residue from the natural gasoline plant which has been proposed to operate on gas from the Chippewa-Greendale area. The major share of the estimated market for 150,000,000 feet of gas daily lies in the industrial demand. One other natural gasoline plant is operating in the area, namely the Bell Gasoline Co.'s plant.

WATCH PRICE ADVANCE

AMARILLO, Tex., June 20.—The advance in the market price for natural gasoline from 1⅝ cents to 2¾ cents within the past week has caused producers in the Panhandle area to consider plans for the erection of gasoline plants there. More than 100 permits have been granted for the extraction of gas since the Texas Railroad Commission was granted authority to issue such permits regardless of the disposition made of the residue gas.

The only factor that has held back the building of new plants in recent months has been abnormally low value of gasoline. Operators indicate that a price of 4 cents will be necessary before a plant could be justified at a majority of locations.

Royalite Gasoline Plant Now in Full Operation

The gasoline absorption plant completed this spring by Royalite Oil Co. in the Turner Valley Field is now reported in complete operation. Tentative operation of the plant commenced about May 1, but during the month a number of adjustments were made with a view to securing the most efficient results.

This absorption and rectifying plant is running gas from wells of the Royalite, Dalhousie and other companies, which are either subsidiaries of or associated with Imperial Oil, Ltd.

W. Calder, Alberta, government petroleum engineer, in a report to Hon. R. G. Reid, provincial minister of lands and mines, states that a daily production of 342 bbls. of natural gasoline, or 124,830 bbls. a year, is expected, representing a gross revenue of around $375,000 a year. The cost of installation, according to the report, is estimated at not more than $300,000. The primary purpose of the plant is to recover natural gasoline that cannot be extracted from the wet gas by the standard separator used up to the present on all wet gas wells. The plant has an estimated capacity of 75,000,000 feet a day.

With the plant in full operation this month the crude gasoline recovery is running around 500 to 600 bbls. a day.

It is possible that arrangements may be made to handle the production of other independent companies on a fair prorata basis.

From the Home wells in Section 20-19-2w5 to the northern limits of the Central Turner Valley, the rock pressures and gasoline content of the gas are lower than in the North Turner Valley and the newer areas of the South Turner Valley. In the latter areas the separator process still yields very satisfactory results. As the field declines, however, it is quite possible that the use of separators may be abandoned and the plant facilities extended to handle the entire production of the field. This may be done, either by extension of the existing Royalite plant or by construction of a second plant which is now being discussed by some of the independent companies. No immediate extension of the Royalite plant is in contemplation, however. The output of the Royalite plant is being taken by the western Canada refineries.

NATURAL BLENDED WITH CRUDE

The Phillips Petroleum Co. expects to utilise the new line from Oklahoma City pool for the transportation of natural gasoline next fall and will modify the company's line from Thrall, Kansas, to its refinery at Kansas City, Kansas, by installing vapor tight tankage by that time.

The new line is now used to transport crude from the company's wells in the Oklahoma City area to a tank farm located at Thrall, Kans. Here the crude is picked up and transported to the Kansas City refinery through the line originally identified as the Independent Oil & Refining Co.'s line. It is the latter which will be equipped to handle a mixture of natural gasoline and crude.

Approximately 100,000 gallons of gasoline will be transported in this manner daily when the project is completed.

CANADIAN IMPORTS

Imports of natural casinghead gasoline into Canada in March advanced to 2,521,403 gallons valued at $167,183 as compared with the February total of 868,600 gallons valued at $40,353. Gasoline lighter than .8235 specific gravity at 60° temperature imported in March amounted to 1,607,920 gallons worth $123,062.

NEWS FOR SALES DEPARTMENTS

Complete Analyses of Farm Demand for Petroleum Products

WASHINGTON, D. C., June 17.—More than 2,125,000,000 gallons, or 50,595,238 bbls. of petroleum fuels, including gasoline, kerosene and distillates, together with approximately 90,700,000 gallons of lubricating oils were used on farms in the United States in 1930. This compilation was made by the U. S. Department of Agriculture and has just been released.

More than half the fuel and lubricating oil was used in automobiles. The latter, it was estimated, consumed 1 quart of oil per 100 miles and trucks 1 quart for each 50 miles. Other power units were estimated as consuming 1 gallon of oil for each 20 gallons of fuel.

Gasoline tractors used 526,500,000 gallons of fuel and 26,300,000 gallons of lubricants. Trucks consumed 225,000,000 gallons of fuel and 11,250,000 gallons of oil; stationary gas engines used 90,000,000 and 4,500,000 gallons, respectively. Harvester-threshers used 21,188,000 gallons of fuel and 1,059,000 gallons of oil, end electric light plants, 21,627,000 and 1,081,000 gallons, respectively.

The horsepower hours developed by the various power units were: Gas tractors, 2,530,000,000 for drawbar and 1,540,000 for belt work; stationary gas engines, large and small, 799,200,000 hours; harvester-threshers, 169,000,000, and electric light plants, 129,760,000 hours. The estimated mileage and fuel for trucks was 2,500 miles each, with fuel consumption of 1 gallon for each 10 miles, and for automobiles 4,500 miles each, with fuel consumption of 1 gallon for each 15 miles. Although the automobile is not considered a source of power for farm work, probably 50 per cent of its operating time is directly associated with farm business.

In 1930 there were approximately 4,135,000 automobiles, 900,000 trucks, 920,000 gas tractors, 1,131,000 stationary gas engines, 61,000 harvester-threshers, and 270,000 electric light plants on farms in the United States.

STOPPING BOOTLEG GASOLINE

The Kansas law effective May 1, 1933, which provided for ports of entry in the truck movement of gasoline into the State is serving to stop gasoline tax evasion and also has prevented the sale of inferior gasolines, according to Seth G. Wells.

"We have picked up several bootleggers and a large amount of bad gasoline," Mr. Wells said last week. "Our preliminary reports from the inspectors at the points of entry show we are getting the tax on a large amount of gasoline now which we are certain came into the State tax-free before the law became effective. But one of the real effects of the law is the stopping of bad gasoline coming into the State."

REPORT ON ALCOHOL BLENDS

WASHINGTON, D. C., June 20.—The American Automobile Association today reported on the results obtained in tests of alcohol-gasoline blends when used as motor fuels. The road tests showed that a fuel containing 10 per cent alcohol was 5 per cent less efficient than the straight gasoline.

In addition to the roads' test, laboratory tests were conducted under the auspices of the association. One of these tests clearly showed that the alcohol-gasoline blend used more fuel than a straight gasoline fuel.

World Survey Shows Decline of 4 Per Cent in Petroleum Products Demand

By V. R. GARFIAS and R. V. WHETSEL
Foreign Oil Department, Henry L. Doherty & Co., New York

The world's consumption of petroleum products in 1932 is estimated at 1,317,000,000 bbls., of which gasoline represents 40 per cent, kerosene 8, gas and fuel oil 39, lubricating oils 3 and miscellaneous products 10 per cent.

The following table lists the countries consuming more than 1,000,000 bbls. yearly in the order of their consumption, the countries with yearly consumption lower than 1,000,000 bbls. being grouped under the heading of miscellaneous. The figures are based on a more careful study than was possible last year when the writers published an estimate of the consumption in 1931 and, therefore, unavoidable discrepancies will be found in comparing the two tabulations.

The total consumption for 1932 was only 56,000,000 bbls. or approximately 4 per cent lower than for the previous year, showing that the oil industry has not been affected as seriously as many others on account of curtailment in the demand for its products. It is hoped that some of the steps now being considered in Washington and elsewhere will do away with some of the obstacles that handicap the petroleum industry, such as haphazard overproduction particularly in the United States with the resultant prevailing demoralization in prices.

WORLD CONSUMPTION OF PETROLEUM AND ITS PRODUCTS IN 1932
(Data in thousands of barrels)

		Gasoline	Kerosene	Gas and fuel oils	Lubs	Miscellaneous	Total
1.	United States	373,770	33,310	307,678	16,697	192,227	823,682
2.	Russia	6,800	22,770	54,950	4,320	7,656	96,496
3.	United Kingdom	30,500	7,188	21,404	2,764	1,700	63,556
4.	France	19,571	1,584	8,828	1,768	1,814	33,565
5.	Canada	15,440	1,036	13,740	721	1,100	32,037
6.	Germany	12,789	860	4,392	2,015	1,620	21,677
7.	Argentina	4,554	832	12,244	287	820	18,737
8.	India	2,389	6,916	3,668	770	1,236	14,979
9.	Mexico	1,717	389	8,935	141	3,463	14,645
10.	Japan	4,793	850	6,127	1,344	530	13,643
11.	Rumania	706	1,225	9,701	190	1,520	13,342
12.	Dutch East Indies	1,687	2,510	5,750	531	1,356	11,834
13.	Italy	2,915	1,102	5,322	801	229	10,370
14.	Australia	5,359	990	772	413	513	8,047
15.	Dutch West Indies	156	19	5,200	22	2,486	7,883
16.	Persia	461	1,200	3,200	670	1,230	6,761
17.	China	720	4,040	1,530	249	85	6,624
18.	Holland	2,891	1,346	1,376	352	202	6,167
19.	Venezuela	983	25	4,866	42	150	6,066
20.	Spain	3,167	165	1,728	210	280	5,550
21.	Sweden	2,931	612	1,602	321	60	5,526
22.	Belgium	2,266	720	984	590	103	4,663
23.	Brazil	1,787	712	1,846	159	20	4,524
24.	Denmark	1,915	639	1,605	181	14	4,354
25.	Egypt	413	2,142	1,231	114	102	4,002
26.	British Malay	917	230	2,308	62	110	3,627
27.	Cuba	660	173	2,535	50	40	3,458
28.	Phillipine Islands	697	560	1,824	74	102	3,257
29.	Trinidad	110	61	2,690	31	236	3,128
30.	Hawaii	891	106	1,996	45	72	3,020
31.	South Africa	1,990	481	254	146	147	3,018
32.	Switzerland	1,736	194	862	150	25	2,967
33.	New Zealand	1,669	159	968	62	41	2,899
34.	Czechoslovakia	2,001	220	327	190	32	2,780
35.	Poland	643	944	328	357	452	2,724
36.	Norway	847	277	1,335	69	48	2,576
37.	Chile	410	64	1,415	32	18	1,939
38.	Ireland	1,110	420	103	65	124	1,822
39.	Panama Canal Zone	78	22	1,631	8	7	1,746
40.	Uruguay	720	280	707	15	7	1,729
41.	Austria	340	243	425	127	12	1,647
42.	Algeria	930	369	36	21	70	1,417
43.	Greece	492	160	589	61	32	1,334
44.	Jamaica	144	47	1,008	7	5	1,311
45.	Hungary	435	495	207	41	20	1,198
46.	Colombia	281	64	615	20	81	1,061
47.	Hongkong	87	50	897	9	18	1,041
48.	Morocco	626	200	64	45	84	1,019
49.	Iraq	128	163	530	33	156	1,000
	Miscellaneous	5,073	4,443	5,694	707	806	16,723
	Total	523,994	103,588	518,039	38,089	133,261	1,316,971

FAVORABLE DEMAND TRENDS

May production of motor vehicles by member companies of the National Automobile Chamber of Commerce was the highest in 22 months, according to a preliminary report. Output totaled 172,883 units, a gain of 23 per cent over April and of 51 per cent over May, 1932. Production for the first five months of this year, on the basis of this estimate, amounted to 605,739 units as against 584,505 in the same 1932 period.

The country's air lines carried 37,442 passengers in April, compared with 31,778 in March and 28,513 in February. Passenger miles flown during the first four months of the year exceeded the mileage a year ago by 23 per cent. Air express gained 19 per cent in the first four months, while air mail ran 18 per cent behind the same period of 1932.

CANADIAN GASOLINE DEMAND

CHATHAM, Ontario, June 17.—Official figures compiled by the transportation branch of the Dominion Bureau of Statstics from provisional gasoline tax returns show that gasoline sales in Canada in March totaled 26,416,000 gallons, compared with 22,677,000 gallons in February and 26,913,000 gallons in March, 1932.

Comparative figures for the various provinces are as follows:

Province—	March 1932	March 1933
Prince Edward Island	39,000	58,000
Nova Scotia	901,000	765,000
New Brunswick	533,000	371,000
Quebec	4,236,000	3,793,000
Ontario	14,243,000	14,399,000
Manitoba	1,376,000	1,004,000
Saskatchewan	1,010,000	1,099,000
Alberta	1,664,000	2,400,000
British Columbia	2,911,000	2,524,000

Tax Regulations on Gasoline Containing Lubricants Effective

The company which uses lubricating oil in the manufacture of motor fuel is not a producer in the sense that it can purchase gasoline and lubricating oil tax free and then pay a tax on the motor fuel at the time of the sale, according to a ruling of the Bureau of Internal Revenue. The ruling of the revenue department in this matter follows:

"It appears that this lubricating gasoline is a mixture of gasoline and lubricating oil, and it is contended that a person who mixes gasoline and lubricating oil becomes a producer of gasoline within the meaning of Section 617 of the act and therefore entitled to purchase lubricating oil and gasoline for the purpose of mixing together free from the tax imposed under Sections 601 (c) (1) and 617 of the Revenue Act of 1932.

"You are advised that this question was presented to the bureau of Standards for a ruling. From the opinion received from that bureau it appears that lubricating oil which is mixed with gasoline is not burned in the combustion chambers of an automobile engine, but mixes with the crankcase lubricating oil on the cylinder walls of the engine, lubricating the piston rings, gradually seeping down into the crankcase where it acts as a lubricant in the normal manner. It is held by the bureau that a person who is engaged in mixing gasoline and lubricating oil is not a manufacturer or producer of gasoline within the meaning of Section 617 of the act and therefore cannot purchase those products tax free.

"In connection with double taxation, assuming a company to be a producer of gasoline within the meaning of Section 617 of the act, that company would be required to pay tax at the rate of 1 cent per gallon on the gasoline content of the so-called lubricating gasoline, and its status as a producer of gasoline would not exempt sales of lubricating oil to it by manufacturers and producers thereof for use in mixing with gasoline produced by it.

"If the company's only 'manufacturing' operation is that of mixing gasoline and lubricating oil, it would not, as stated above, be a producer of gasoline. Consequently, it would not be entitled to purchase gasoline or lubricating oil tax free and pay tax on its sales or uses of the products. The producers of the lubricating oil and gasoline are liable for the payment of the taxes imposed under Sections 601 (c) (1) and 617 of the Revenue Act of 1932, upon their sales to it.

"Assuming the company to be the actual producer of both the gasoline and lubricating oil which it mixes, regardless of the fact the company may not mix oil with gasoline and pay tax at the rate of 1 cent per gallon on the mixture, but must pay tax at the rate of 1 cent a gallon on the gasoline so used and pay tax at the rate of 4 cents per gallon on the oil used with the gasoline."

NEW TERMINAL OPERATING

HOUSTON, Tex., June 17.—Harbor Terminal Co., which has just completed storage and loading facilities at Texas City, shipped its first cargo of gasoline the past week for coastwise movement to the Atlantic Seaboard. Freeman W. Burford, president of the East Texas Refining Co., Dallas, heads the company, which will furnish a tidewater outlet for crude and refined products for East Texas independents.

Independents and Majors Unanimously Approve Code

(Continued from Page 7)

as representative of the Texas Oil and Gas Conservation Association, pointed out that violations brought to the courts under the current system may not be penalized, if at all, for as long as two years while continuances and other delays were recourses of recalcitrants.

Deliberations on the first draft of the code assembled from two separate originals (one formulated by "majors" and the other by "independents") moved without a hitch through the "purpose" and "labor" sections of the preamble. At "Production," Article 1, changes were made to eliminate such ambiguities as "reasonable market demand," and references to the producing unit to be supervised were modified so that a "per well basis" would not be implied as desirable. Under the item "drilling," no changes except in language were made.

Matter of Fixing Prices

Considerable discussion preceded the adoption of Article 2, relating to price fixing. C. C. Herndon, vice president of Skelly Oil Co., presented a strong case against inclusion of price fixing in the code. Mr. Herndon told the assembled delegates that they would rue the day they invited the Government to fix prices in the oil industry, and that the industry would not consider such a move except for the deep discouragement, which would cause them to trade their birthright for a mess of pottage. W. H. Francis, vice president of Magnolia Petroleum Co., who represented the Mid-Continent Oil and Gas Association, Texas division, said that it was his understanding that the government did not wish to dictate to the industry, but that the industry must clean house if it would avoid such dictation. Wirt Franklin pointed out that the industry had had four years in which to get fair prices and had not done so. At this point more than half of the assembly arose to take the floor and relate their experience proving that the industry has been unable to bring about prices above costs of production and handling. The article covering price was then adopted.

Although not the least semblance of opposition appeared against the adoption of Article 3, relating to petroleum in storage, Mr. Franklin thought it well to point out that those who had stored great quantities of 10-cent crude oil could afford to hold it for five years, and those who bought and stored 25-cent oil could easily hold it for three years and still sell it profitably. This article, with Article 4, relating to imports, was passed without dissent.

Changes in Article 5, consisted principally in improvements in terminology and in the addition of the final sentence in subheading (c) providing for sworn statements as to amount of storage stocks of crude oil on hand and the accruals or withdrawals and the disposition of such withdrawals. This addition was introduced by W. F. Weeks, representing the East Texas Independent Operators Association. Section (e) was adopted after its suggestion by Tom Hogan of Midland, Tex.

While the thought was occasionally expressed that the code might strike constitutional snags in the various states in spite of the National Industrial Recovery Act, particularly in view of references made by George D. Hill, president of Houston Oil Co., to opinions voiced by Charles Evans Hughes before he became chief justice, and by members of the minerals division of the American Bar Association, it was thought that legal difficulties in connection with states' rights could be avoided if the identity of state officials as such could be preserved by expressing their participation in the operation of the code in this wise: "It is respectively suggested that the President request the enforcement officers of the states having statutes relating to the subject of conservation to adopt as their own program which may be approved and promulgated by him in order that the complete power of both Federal and state governments may be exerted in the premises. When so adopted by the state enforcement agencies, it shall be deemed unfair competition to violate the rules, regulations and orders of such state officials issued pursuant to such program."

In the code an emergency national committee is set up to be the general planning and co-ordinating agency for the industry. It will make rules and regulations and gather such statistics as it may deem necessary, and upon complaint of interested parties or upon its own initiative may make inquiry and investigation into the operation of this code. The committee is to make and publish forecasts relating to demand.

J. Edgar Pew, vice president of Sun Oil Co., presided over the general meeting. The "producing" membership of the emergency national committee was drawn equally from the ranks of the so-called independents and majors as follows: Independents, R. B. Lloyd and Neal Anderson, California; C. B. Richardson, (Casper, Wyo.), Rocky Mountain district; W. L. Ainsworth, Kansas; Wirt Franklin and W. W. Warner, Oklahoma; Charles F. Roeser, H. L. Hunt and John Kilgore, Texas; J. R. Crawford, (Shreveport), Arkansas and Louisiana; William Bell (Robinson, Ill.), Indiana, Illinois, Michigan and Kentucky; Ralph T. Zook and A. E. Faine, New York, Pennsylvania, West Virginia and Ohio.

Majors: A. Jacobsen, Amerada Petroleum Corp.; J. Howard Pew, Sun Oil Co.; H. F. Sinclair, Consolidated Oil Corp.; J. F. Drake, Gulf Oil Co.; George A. Hill, Houston Oil Co.; Frank Coates, Cities Service Oil Co.; O. D. Donnell, Ohio Oil Co.; J. C. van Eck, Shell Union Oil Co.; K. R. Kingsbury, Standard Oil Co. of California; W. F. Humphrey, Tide Water Consolidated Oil Co.; C. B. Ames, the Texas Co.; Walter C. Teagle, Standard Oil Co. (New Jersey), and Frank Phillips, Phillips Petroleum Co.

California Crude Oil Prices

STANDARD OIL CO. OF CALIFORNIA
(Effective March 5, 1933)

For current purchases of crude oil at the well (unless otherwise specified). (All gravities above those quoted take highest price offered in that field.)

Gravity—	Long Beach	Seal Beach, Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda, Brea Canyon	Athens—Rosecrans	Torrance	Richfield	Whittier	Montebello	LaHabra, Coyote	Santa Fe Springs	Midway-Sunset, Elk Hills, Buena Vista Hills	Lost Hills	Coalinga
14-14.9	$.55	$.55	$.55	$.55	$.55	$.55	....	$.55	$.55	$.55	$.55	$.55	....	$.49	$.49	$.49
15-15.9	.55	.55	.55	.55	.55	.55	....	.55	.55	.55	.55	.55	....	.49	.49	.49
16-16.9	.55	.55	.55	.55	.55	.55	....	.55	.55	.55	.55	.55	....	.49	.49	.49
17-17.9	.56	.56	.58	.58	.58	.58	....	.57	.56	.57	.55	.55	....	.49	.50	.49
18-18.9	.57	.56	.61	.61	.60	.61	....	.59	.58	.59	.55	.57	....	.49	.52	.49
19-19.9	.59	.57	.63	.64	.62	.64	....	.61	.61	.61	.55	.59	....	.49	.54	.49
20-20.9	.61	.59	.64	.67	.64	.66	....	.62	.63	.63	.55	.61	....	.52	.56	.49
21-21.9	.63	.62	.66	.69	.66	.68	....	.64	.66	.65	.55	.63	$.57	.55	.58	.51
22-22.9	.65	.64	.68	.71	.68	.70	....	.66	.68	.67	.57	.65	.59	.57	.60	.53
23-23.9	.67	.67	.70	.73	.71	.72	....	.68	.69	.69	.60	.67	.63	.59	.62	.56
24-24.9	.69	.69	.73	.75	.73	.73	$.65	.70	.73	.71	.63	.69	.64	.63	.63	.57
25-25.9	.71	.72	.74	....	.75	.75	.66	.72	.75	....	.65	.71	.66	.66	.65	.59
26-26.9	.73	.74	.75	....	.77	.77	.70	.73	.77	....	.68	.73	.69	.68	.67	....
27-27.9	.76	.76	.77	....	....	.79	.73	....	.80	....	....	.74	.71	.71	.69	....
28-28.9	.77	.79	.79	....	....	.81	.75	....	.83	....	....	.76	.73	.74	.71	....
29-29.9	.79	.81	.81	....	....	....	.78	....	.84	....	....	.78	.76	.76	.73	....
30-30.9	.81	.84	.83	....	....	....	.81	....	....	....	....	.80	.78	.79	.75	....
31-31.9	....	....	....	....	....	....	.83	....	....	....	....	.82	.80	.82	....	....
32-32.9	....	....	....	....	....	....	.86	....	....	....	....	.84	.83	.85	....	....
33-33.9	....	....	....	....	....	....	.86	....	....	....	....	.86	.85	.87	....	....
34-34.9	....	....	....	....	....	....	.86	....	....	....	....	.88	.87	....	....	....
35-35.9	....	....	....	....	....	....	.88	....	....	....	....	....	.90	....	....	....
36-36.9	....	....	....	....	....	....	....	....	....	....	....	....	.92	....	....	....
37-37.9	....	....	....	....	....	....	....	....	....	....	....	....	.94	....	....	....
38-38.9	....	....	....	....	....	....	....	....	....	....	....	....	.96	....	....	....
39 and over	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Signal Hill—Met on same day by The Texas Company, Union Oil Co. and General Petroleum Co., and Associated Oil Co.

Huntington Beach—The Texas Company, Union Oil Co., General Petroleum Co. and Associated Oil Co. schedules stop at 26-26.9 degrees, 75 cents.

Seal Beach, Alamitos Heights—The Texas Company met all prices; Union Oil Co., General Petroleum Co. and Associated Oil Co. schedules stop at 26-26.9 degrees, 75 cents.

Athens, Rosecrans, Dominguez—Union Oil Co. schedule stops at 25-25.9 degrees, posting 23-23.9 degrees, 65 cents; 23-23.9 degrees, 67 cents; 24-24.9 degrees, 69 cents; 25-25.9 degrees, 90 cents. Associated Oil Co. met Standard Oil Co. schedule; General Petroleum Co. met Standard Oil Co. prices, stopping at 25-25.9 degrees at 86 cents.

Torrance—Met by The Texas Company. Met by Associated Oil Co, General Petroleum Co. and Union Oil Co., up to 25-25.9 degrees at 75 cents.

Inglewood—Met by Associated Oil Co. and General Petroleum Co.

Playa Del Rey—(Prices subject to 5 cents per barrel gathering charge. Met by Union Oil Co. schedule starting at 19 gravity.

Olinda-Brea Canyon—Met by Union Oil Co. Met by General Petroleum Co., up to 25-25.9 degrees at 75 cents.

Santa Fe Springs—Met by The Texas Company, General Petroleum Co., Union Oil Co. and Associated Oil Co.; schedules start at 24-24.9 degrees, 64 cents, and end at 35-35.9 degrees, 90 cents.

East Coyote—Effective March 5, Union Oil Co.: 14 to 16.9 degrees, 55 cents; 17-17.9 degrees, 57 cents, with 2 cents added for each degree upward to 24.24.9 degrees, at 71 cents.

Richfield—Met by The Texas Company; met by Union Oil Co. up to 25-25.9 degrees, at 75 cents.

Montebello—Met by Union Oil Co. up to 25-25.9 degrees, at 65 cents.

Kern River, Mount Poso, McKittrick, Sunset, Midway, Elk Hills, Buena Vista Hills—Effective March 5, Union Oil Co.: 11-13.9 degrees, 44 cents; 14 to 16.9 degrees, 49 cents; 20-20.9 degrees, 52 cents; 21-21.9 degrees, 55 cents; 22-22.9 degrees, 57 cents; 23-23.9 degrees, 60 cents; 24-24.9 degrees, 63 cents; 25-25.9 degrees, 66 cents; 26-26.9 degrees, 68 cents; 27-27.9 degrees, 71 cents; 28-28.9 degrees, 74 cents; 29-29.9 degrees, 76 cents; 30-30.9 degrees, 79 cents. Associated Oil Co., scheduled in Midway, Elk Hills and Buena Vista Hills starts at 11 to 13.9 degrees, 44 cents; same as Union Oil Co. schedule from 14 to 29.9 degrees; 30-30.9 degrees, 79 cents. General Petroleum Co.: Effective March 5 in Midway-Sunset same as Associated Oil Co.; Fruitvale, Kern River, Mount Poso and Round Mountain, 49 cents for all grades.

Montebello—Met by Union Oil Co. up to 25-25.9 degrees, at 65 cents; The Texas Company's schedule in Montebello and North Whittier, 14 to 21.9 degrees, 55 cents; 22-22.9 degrees, 57 cents; 23-23.9 degrees, 60 cents; 24-24.9 degrees, 62 cents; 25-25.9 degrees, 65 cents; 26-26.9 degrees, 68 cents.

Santa Paula—Union Oil Co., March 5, 14 to 19.9 degrees, 55 cents; 20-20.9 degrees, 56 cents, with 1 cent added for each degree upward to 25-25.9 degrees, at 61 cents, and then 2 cents added for each degree upward to 30-30.9 degrees, at 71 cents. The Texas Company posts similar schedule in Santa Paula and Shiells Canyon.

Lost Hills-Baldridge—Met by Associated Oil Co. and Union Oil Co., with Union Oil Co. paying 44 cents for 11 to 12.9 degrees gravity.

Coalinga—Met by Union Oil Co. and Associated Oil Co. on March 5 and General Petroleum Co. on March 15, but latter company and Associated Oil Co. posted 44 cents for 11 to 13.9 degrees effective March 5.

Ventura Avenue—Associated Oil Co., March 5, 22-22.9 degrees, 58 cents, with 2 cents added for each degree up to and including 30-30.9 degrees at 74 cents. Effective March 15, General Petroleum Corp.

Orcutt—Union Oil Co., effective March 5: From 16 to 19.9 degrees, 49 cents; 20-20.9 degrees, 52 cents; 21-21.9 degrees, 55 cents; 22-22.9 degrees, 57 cents; 23-23.9 degrees, 60 cents; 24-24.9 degrees, 63 cents; 25-25.9 degrees, 66 cents; 26-26.9 degrees, 68 cents.

Kettleman Hills—Effective March 5, Standard Oil Co., Union Oil Co. and Associated Oil Co.: 22 to 22.9 degrees, 60 cents, with 2 cents added for each degree upward to 29-29.9 degrees at 78 cents. Effective March 15, General Petroleum Corp.

Elwood—Prices f.o.b. ship—Standard Oil Co. of California, effective March 5: 22-22.9 degrees, 52 cents; 24-24.9, 55 cents; 25-25.9 degrees, 57 cents; 26-26.9 degrees, 59 cents; 27-27.9 degrees, 61 cents. Met by Union Oil Co.

Newhall, McKittrick and Kern River—Standard Oil Co. of California, 55 cents for all grades, effective March 5.

Wheeler Ridge—Standard Oil Co. of California, effective March 5: 14 to 20.9 degrees, 49 cents; 21-21.9 degrees, 50 cents; 22-22.9 degrees, 52 cents; 23-23.9 degrees, 54 cents; 24-24.9 degrees, 56 cents; 25-25.9 degrees, 58 cents.

Elsmon—General Petroleum Corp., effective March 15: 22-22.9 degrees, 54 cents; 2 cents added for each degree upward to 30-30.9, at 78 cents.

Crude Oil Prices

(Continued from Page 19)

Greybull (June 17, 1933)	.62
Cat Creek (May 6, 1933)	.35
Pondera (Nov. 7, 1932)	.60
Sunburst, Mont. (June 17, 1933)	.36
Hogback, N. Mex. (June 17, 1933)	.65
Lea County, N. Mex. (See Note)	.30
Maljamar (June 19, 1933)	.35
Artesia-Jackson (June 19, 1933)	.35

Note—Salt Creek, Cat Creek, Dry Creek, Dallas-Derby, Hudson, Greybull, Hogback, and Iles by Stanolind Oil & Gas Co. and remainder by Ohio Oil Co. Both companies posted Grass Creek light and Elk Basin. Lost Soldier posted by Producers & Refiners Corp. Artesia, Jackson and Maljamar posted by Continental Oil Co. Lea County, effective June 19, by all purchasers; Fort Collins, Wellington, Orchard, Florence, Big Muddy, Cat Creek, Rattlesnake and Table Mesa by Continental Oil Co. Osage posted by Arro.

*Continental Oil Co. †Ohio Oil Co.

Middle Western States

OHIO OIL CO.
(Effective June 16, 1933)

Lima	$0.75
Wooster (May 8, 1933)	.50
Illinois	.67
Indiana	.45
Princeton	.67
Plymouth	Shut in
Western Kentucky	.62
Midland, Mich. (May 8, 1933)*	.75
Somerset, Ky. (June 20, 1933)	.60
Muskegon, Mich. (Mar. 27)	See note

*Posted by Pure Oil Co. Producers Pipe Line Co. pays 5 cents per barrel over Pure Oil Co.'s posted price. Muskegon: All companies pay $1 per barrel effective March 27. Somerset, Ky., crude purchased by Ashland Refining Co., Ashland, Ky., and posted price includes premium.

Canada

Ontario (Jan. 18, 1933):	
Petrolia*	$1.75
Oil Springs*	1.85
Turner Valley†:	
Crude oil, 31°-35.9° (Jan. 24, 1933)	1.41
Crude oil, 36°-49.9° (Jan. 24, 1933)	1.90
Crude oil, 50° up (Jan. 24, 1933)	2.41
Discolored naphtha (Jan. 24, 1933)	2.58
Crude naphtha (Jan. 24, 1933)	2.83

*Imperial Oil, Ltd. †Imperial Oil, Ltd., and Regal Oil & Refining Co.

Mexico

Panuco*	$0.375

*F.o.b. ship, based on May transactions and exclusive of production and export taxes and bar dues.

Changes in Policies Give Sound Basis for New Code

(Continued from Page 9)

majority of Mid-Continent and Middle West refiners sell a large part of their gasoline to jobbers on contracts which center around this spot tank car market as a basis. It is now apparent that major companies, many of which sell relatively little gasoline on a tank car basis, are no longer going to attempt to ignore this market, but are in fact adopting it as the basis for their entire price structure in the case of gasoline. It has been pointed out that this in effect means that regardless of what happens to crude prices and all other markets, the retail and tank wagon prices for gasoline will move up and down with the gasoline tank car prices, the market for which centers in the Mid-Continent area. The Oklahoma market will be used in many cases as the base because it is the most important in the Mid-Continent.

How Plan Works

For the purpose of showing how the new marketing plan works out, a detailed explanation of its application in Ohio by the Standard Oil Co. of Ohio will be given. The Ohio Standard in its new plan, which became effective June 14, gave a more detailed explanation of its workings than did the other Standard companies. The Ohio company is an outstanding refining and marketing organization and is said to have a larger percentage of the gasoline business in Ohio than is enjoyed by other companies in any of the large consuming states. The company has refineries located at Cleveland, Toledo and Lima, Ohio, and one at Latonia, Ky., so that all parts of the State can be conveniently served with relatively short hauls. The company secures the bulk of the crude oil for its refineries from Oklahoma by pipe line so that transportation cost is a direct factor in its cost of operations.

The Standard of Ohio gasoline price starts with the published price for 65 octane U. S. Motor gasoline in Oklahoma. For the purpose of this explanation this base price will be taken as 3.75 cents per gallon, which was in line with the actual going market in Oklahoma the first of the week. The accompanying table explains the application of the company's new marketing policy.

Limitation on Margins

An interesting feature of the Standard of Ohio plan is the limitation placed on margins to authorized agents and dealers when prices become depressed below normal. The Ohio company will share these reductions equally with the agents and dealers until the following margins, including rentals, are obtained: Ethyl Gasoline (premium grade), 2 cents; X-70 (regular grade), 2 cents, and Renown Green (third grade), 1 cent. In the case of dealers these margins are 2, 2 and one-half cent for the three grades. The company also will protect jobbers in margins until a 4.5-cent margin is reached. At that point the jobber will absorb all of the additional price cuts. The tank wagon price to commercial consumers in depressed areas always will equal the local tank wagon price to open dealers. This means that in case of a price war the dealer shares equally with the refiner in any reductions until the 2.5-cent limit is reached and then the dealer absorbs all of any additional reductions. This policy serves the purpose of protecting the refiner in regard to price reductions to him and also makes the dealer directly interested in maintaining normal prices in his territory. In the past, many jobbers and dealers have had a guaranteed margin which did not fluctuate regardless of what happened to the retail prices.

Standard of New Jersey

The Standard Oil Co. of New Jersey markets in several states along the Atlantic Seaboard, starting with South Carolina. A subsidiary, the Colonial Beacon Oil Co., markets in New York state and the New England states. Under the new plan the Standard company has base tank car prices at its water terminals and refineries. These will be changed from time to time with fluctuations in the Gulf Coast gasoline prices which in turn are directly competitive with the Oklahoma and other Mid-Continent markets. The New Jersey company has not stated just how much above the Gulf Coast price the eastern seaboard tank car prices will be. This will probably fluctuate with changes in tanker rates for water movement. These rates over the past two years have been extremely low and the tanker cost including loading and unloading has been around 1 cent per gallon.

Base tank car prices are established at interior consuming points by adding transportation charges to the terminal tank car prices. At these points, the New Jersey company through its own stations establishes posted service station prices for the regular grade gasoline which are 7.5 cents above the base tank car price. A discount of 2 cents is allowed to retail customers for cash and this means that the net retail price is 5.5 cents above the tank car price.

Controlled dealers pay 2 cents above the tank car price and uncontrolled dealers 2.5 cents. The dealers are not protected in price wars. If dealers and other buyers see fit to cut prices they lose an operating margin equal to the cut in retail prices. The company allows the following prices over the tank car prices to commercial consumers buying on a contract basis with tank wagon deliveries: From 1,000 to 75,000 gallons yearly, 2.5 cents; 75,000 to 300,000 gallons, 1.5 cents; over 300,000 gallons, 1 cent.

Standard of Louisiana

The Standard Oil Co. of Louisiana, which markets in Louisiana, Arkansas and Tennessee has adopted the same general price plan as the Standard of New Jersey of which it is a subsidiary. Instead of 7.5 cents its posted service station price, not including a 2-cent reduction for cash, is 7 cents over the delivered tank car price. The Louisiana Standard recognizes the Mid-Continent tank car markets by taking refining centers in North Texas, Louisiana, Arkansas and Oklahoma as the base points in determining the delivered tank car prices in its territory.

Standard of Indiana

It will be noted that in the foregoing schedules that gasoline prices to all classes of jobbers, dealers and consumers are built up from a base tank car price. The Standard of Indiana plan differs in that it adheres to the old plan of taking the tank wagon or service station prices as the base and giving discounts under these prices to dealers and other classes of buyers. When these changes are carried back to the tank car market, however, it will be found that they are built around the same basic tank car market as determined in Oklahoma sales.

The now famous ten points of the Standard of Indiana have been interpreted in actual prices and the elimination of previous practices. The loaning and leasing of equipment has been stopped and hauling contracts and yard prices are not permitted.

Effective June 6 on new business, and effective July 1 on existing business, allowances to resellers and controlled accounts will be at the rate of 2½ cents on premium, 2½ cents on regular, and 1½ cents on third grade. A controlled account is a private drive-in service station which is properly subject to lease.

Effective June 6 on new business, and effective July 1 on existing business, all rentals to controlled accounts will be on the basis of one-half cent per gallon, making the total allowance for rental and commission to controlled operators 3 cents on premium and regular and 2 cents on third grade. Where it is not possible to reduce rentals to one-half cent, due to legal impediments, a compensating change will be made in commissions so that the total of rental and commissions will not exceed 3, 3 and 2 cents.

Flat rentals will be paid only on service stations for company operation (where neither the lessor nor any of his relatives will be the operator) and then only when leases are taken for a period of five to ten years and are noncancellable.

Effective June 6 on new business, and effective July 1 on existing business, both resellers and controlled accounts will get a provision in their contracts to the effect that they will stand one-half of any local service station price reduction up to a maximum of 1 cent per gallon on all grades. In other words while the maximum allowance to these accounts, not including any rent to the proper type of accounts, is to be 2½, 2½ and 1½ cents, the guaranteed allowance is only 1½, 1½ and one-half cent.

The discount is 2 cents on premium, 2 cents on regular and 1 cent on third grade to commercial tank wagon buyers who purchase 500 gallons or more per calendar month. This applies only to commercial accounts. There is only one schedule of discounts regardless of the size of the purchase.

Pennsylvania Grade Crude Assn. Will Hear Varied Program at Convention

STATE COLLEGE, Pa., June 17.—The tenth annual meeting of the Pennsylvania Grade Crude Oil Association will be held at Nittany Lion Inn, State College, on June 29 and 30.

On the opening day, from 9 a.m. until 1 p.m. (E.S.T.), convention visitors who are members of the association, or their

R. T. ZOOK
President, Pennsylvania Grade Crude Oil Association

representatives, will be conducted from the Nittany Lion Inn in groups through the laboratories of the departments of mineral industries, chemistry and physics, and mechanical engineering and the petroleum research laboratory of the Pennsylvania Grade Crude Oil Association. Guides will explain the research work being carried on through co-operation of Pennsylvania State College and the Pennsylvania Grade Crude Oil Association.

The program at Nittany Inn opens at 1 p.m. and the two-day schedule of business and addresses will be as follows:

Luncheon at Nittany Lion Inn. Ralph T. Zook, president of the association, presiding.

Address—"Pennsylvania State College and the Oil Industry," Dr. Ralph D. Hetzel, president Pennsylvania State College.

Address—"The Market Outlook," Thomas O. Grisell, executive secretary Pennsylvania Grade Crude Oil Association, Oil City, Pa.

Address—"Production Methods and Oil Reserves in the Pennsylvania Grade Area," Kenneth B. Nowels, chief petroleum engineer, Forest Oil Corp., Bradford, Pa.

Address—"The Manufacturer of Pennsylvania Bright Stocks—Present and Future," P. M. Robinson, development and research engineer, the Pennzoil Co., Oil City, Pa.

Address—"High Quality Pennsylvania Neutrals," MacLean Houston, refinery superintendent, United Refining Co., Warren, Pa.

Address—"Gear Lubricants," Frank J. Philippbar, chief chemist, Kendall Refining Co., Bradford, Pa.

Adjournment.

Private Dining Room.

Discussion of technical papers, by Messrs. Robinson, Houston and Philippbar. C. R. Wagner, chief chemist, Pure Oil Co., Chicago, discussion leader.

Friday, June 30

Nittany Lion Inn—Harry A. Logan, president United Refining Co., Warren, Pa., presiding.

Address—"Since 1931," Ralph T. Zook, Sloan & Zook, Bradford, Pa., president of the Pennsylvania Grade Crude Oil Association.

Address—"Interim Report on the Progress of Research to Determine the Service

T. O. GRISELL
Executive Secretary, Pennsylvania Grade Crude Oil Association

Performance of Various Lubricating Oils in Automotive Engines," Dr. H. A. Everett, head of the department of mechanical engineering, Pennsylvania State College.

Address—"Premium Lubricants From Pennsylvania Grade Oil," Dr. Merrill R. Fenske, director of research, Petroleum Research Laboratory, State College, Pa.

Address—"Marketing a National Brand of Motor Oils," Joseph Koch, sales manager, Quaker State Refining Co., Oil City, Pa.

Address—"Mush, Mustard and Motor Oil—a Future Formula for Profits?" by William C. McCreary, president Oil Jobbers Refining Co., Chicago.

Annual business meeting of the association, Ralph T. Zook, president, presiding.

Report of the nominating committee.

Election of directors.

Adjournment.

Informal luncheon, Nittany Lion Inn, Thomas O. Grisell, presiding.

Address—"Government and Business—Some Recent Changes," Fayette D. Dow, vice president and general counsel, Pennsylvania Grade Crude Oil Association, Washington, D. C.

Russian Well Reported Making 100,000 Barrels

Russian geologists have discovered what gives promise of being Russia's richest oil field. A well has recently been brought into production which is yielding 15,000 tons (approximately 100,000 bbls.) of light oil daily. This well is No. 45 on the Lok-Batan area, southwest of Baku some 20 kilometers. It stretches between the oil-bearing areas of Shubany and Puta and is regarded as a continuance of the Shubaninsky fold. Last year 14 wells were drilled at Lok-Batan, and each well passed through eight distinct oil horizons. Half of these wells have proved to be gushers, and Prof. V. A. Selsky, senior geologist of the Industrial Sector of Glavneft, says each of these wells has yielded thousands of tons daily. It is stated other oil horizons exist at greater depths, and this would seem confirmed by the neighboring field of Bibi Eibat, where the seventeenth oil horizon is being operated.

The mud volcano of Lok-Batan is in the southern part of the Yassoman Valley, and its northern slopes are stated to represent one of the richest oil fields of the U.S.S.R. Research drilling was commenced and the first exploratory wells sunk in 1932, and two rich oil strata of commercial importance were struck at comparatively shallow depth. The new well considerably exceeds the recent well No. 13 on the Neftdag Field. During the current year 25 wells have been drilled in this field and this is the third gusher reported. In Russia's other new oil field, Kala, well No. 21 is stated to be flowing from a depth of 117 meters with a daily yield of 1,500 tons of light crude.

Late Fields

KANSAS

Derby Oil Co.'s No. 2 Schmidt, in Section 17-22-3w, the first Wilcox sand well in the north end of the Hollow Pool, in Harvey County, Kansas, was put on the pump and made 140 bbls. of oil in two hours from the Wilcox sand at 3,560-78 feet.

Sinclair Prairie Oil Co.'s No. 1 Neufeldt, SE cor. NE Section 18-22-3w, in the Hollow Pool, found the top of the Hunton lime at 3,410 feet.

Slick, Pryor & Lockhart's No. 1, NW cor. SW Section 26-18-10w, Rice County, found the conglomerate at 3,214-40 feet, where oil rose 1,400 feet in the hole in 12 hours. It will be given a treatment of acid before making a production test of the oil showing.

In the south end of the Hollow Pool, in Harvey County, W. C. McBride, Inc.'s No. 3 Schmidt, NW cor. NE NE Section 30-22-3w, a twin well, will be drilled to the Wilcox sand. It is located south and west from the other two Wilcox sand producers in the south end of the field.

C. B. Davis has made a location for a test well in the southwestern part of the Chase townsite. With an increase in the price of crude oil, development is expected to show an increase on the Chase townsite since the Ramsey Brothers completed a 1,000-bbl. well just north of Chase townsite.

About 12 miles southeast of Hutchinson, the Continental Oil Co. has a block of around 3,000 acres on which a test well may be started. Core drill tests have been made of this acreage. The acreage includes parts of Sections 4, 5, 7, 8 and 9, Township 23-3w, and Section 32-22-3w, Reno County.

Lario Oil & Gas Co., Dieter & Warren's No. 1 Fulton, SW cor. NW Section 14-16-2w, Saline County wildcat, has resumed drilling at 3,125 feet. It will be drilled to test the Siliceous lime which is expected at 3,600 feet. A showing of gas was found in the Mississippi lime at 2,995-3,008 feet. The 6-inch casing was landed at 3,100 feet.

OKLAHOMA

The Carter Oil Co.'s No. 1 Canard, C S half SW SE, Section 35-11-6, was still plugging back to test the Hunton lime at 4,090-4,222 feet. This well was drilled to the Wilcox sand at a total depth of 4,488 feet where it found water.

The potential production of some of the important pools in the Greater Seminole group show a decline of around 20 per cent from the previous potential. The Earlsboro Pool, in Pottawatomie County, from partial returns of about 75 per cent of the wells in the pool, shows a potential of 15,035 bbls. compared to 18,962 bbls. shown by the same wells on the previous potential. On the same basis the Little River Pool shows a decline of 17 per cent. The new potential is 22,287 bbls. compared to 26,975 bbls. The Searight Pool has a partial potential of 4,977 bbls. compared to 6,446 bbls. which is a decline of 23 per cent.

The wildcat test of the Gypsy Oil Co. and others, No. 1 Miller, C NE SE, Section 28-17-4w, Logan County, found the Oswego lime at 5,488 feet which is 212 feet higher than the Ramsey Petroleum Corp.'s No. 1 Duck Club, in Section 10-16-4w, the nearest well which found water in the Wilcox sand. The Gypsy Oil Co.'s well was drilling at 5,840 feet. It also found 2,000,000 feet of gas in sand at 4,844-96 feet.

The Shell Petroleum Corp. and others' No. 1 Faulkner, C NE NW Section 11-15-4w, another wildcat test in Logan County, was drilling in lime at a total depth of 6,400 feet, which is believed to be the top of the Simpson sand series. The test found the Viola lime at 6,365-85 feet.

Navajo Oil & Gas Co. and others' No. 1 Martin, SE cor. SW NW Section 18-1-5w, a wildcat in Stephens County, was preparing to land casing at 4,835 feet, after the hole started caving and stuck the drill pipe.

The Denver Producing & Refining Co.'s No. 1 Noe, NW cor. SW SW Section 34-10-10w, a wildcat in Caddo County, was drilling deeper at 9,100 feet, as the deepest drilling test in the State.

All Crude Oil Prices in Fields East of California Substantially Advanced

In every major division east of California crude oil prices have been advanced in the past week. In many cases the new prices are the same as those prevailing before East Texas went wild, upsetting the whole crude market, early in May, but in some fields the new prices range higher than the old schedule prevailing in the early months of the year.

The reduction of the East Texas allowable to 573,000 bbls. per day and the passage of the Industry Recovery Act by Congress were jointly responsible for the increases.

Only one company made a statement concerning the price rise and it was a note of warning. The continuance of the new prices, or the hope of better prices, is contingent upon a balance between supply and demand, Humble Oil & Refining Co. having this to say on the subject:

"The Humble Oil & Refining Co. is actuated by its desire not to be out of line with other purchasing companies, and further by the hope that a balance between consumptive demand and production of crude in Texas may speedily be brought about. Texas is currently producing a large quantity of oil in excess of consumptive demand and only through the elemination of this excess production can this advance in prices be maintained."

Effective June 15, the Tide Water Oil Co. posted 45 cents per barrel for Conroe, Texas, crude oil, but on June 19 changed this to a gravity schedule ranging from 50 cents for 35-35.9 gravity up to 64 cents for 40 degrees and over, with a 2-cent spread for each degree.

Effective June 14, the Bell Oil & Gas Co. posted in North Texas and southern Oklahoma a graded schedule of prices beginning with 35 degrees and below at 40 cents and adding 2 cents per barrel for each degree upward to 40 degrees and over at 50 cents.

Effective June 16 the Olney Oil & Refining Co., Wichita Falls, Tex., posted 46 cents per barrel for crude of 38 degrees and below, 48 cents for 39-39.9 degrees and 50 cents for 40 degrees and over.

Effective June 17 the Sinclair Prairie Oil Marketing Co. resumed its old crude oil price schedule of January 18, in Kansas, Oklahoma, North Texas and East Central Texas (Mexia district): Below 29 degrees, 28 cents, with 2 cents added for each degree upward to 40 degrees and over at 52 cents. The same company at the same time posted a flat price of 50 cents per barrel for East Texas crude, which was also a resumption of the old price effective on January 18.

All leading purchasing companies met the Sinclair Prairie prices in Kansas, Oklahoma and North and East Central Texas, and all companies posting prices in East Texas met the 50-cent price in that field.

The Sinclair Prairie Oil Marketing Co. also posted for the first time in the Texas Panhandle Field and resumed its old gravity prices in the Gulf Coast.

Two sets of prices have been posted in both the Panhandle and the Gulf Coast fields. The Sinclair Prairie Oil Marketing Co., Humble Oil & Refining Co. and the Gulf Pipe Line Co. posted like prices in the Gulf Coast and the Texas Co. a slightly different set of prices, while in the Panhandle the Humble and Gulf companies offer one set of prices and the Sinclair Prairie, Texas, Magnolia, Phillips and Wilcox companies another.

In the Conroe Pool in South Texas, the Humble Oil & Refining Co. posts a different schedule than the Tide Water Oil Co. and the Texas Co. The Humble Oil & Refining Co. for the first time posted a price, 65 cents, in Tomball, Tex., and the Shell Petroleum Corp. for the first time posted a price, 50 cents per barrel, in the new Livingston, Polk County, Pool, in South Texas.

All Southwest Texas and West Texas prices were raised by all companies.

In North Louisiana and Arkansas, the Standard Oil Co. of Louisiana set up a different but higher schedule of prices in different fields while the Texas Co. posted the 28 to 52-cent Mid-Continent scale of prices for all fields in which it purchases on a gravity basis. All companies posted 30 cents in Smackover, Ark.

The Stanolind Oil & Gas Co., the Ohio Oil Co. and Continental Oil Co. raised prices in the Rocky Mountain fields.

The South Penn Oil Co., Pure Oil Co. and Tide Water Pipe Co. advanced all prices in the Pennsylvania grade fields and the Ohio Oil Co. did likewise in the Lima, Indiana, Illinois and western Kentucky fields. The Ashland Refining Co. advanced Somerset, Kentucky, oil.

Continental Supply Co. to Move to Dallas Oct. 1

Main headquarters of the Continental Supply Co. will be moved to Dallas from St. Louis about October 1. The building to be occupied in Dallas will be known as the Continental Supply Co. Building and will be located at Commerce and Lane Streets. This building formerly was occupied by the J. W. Crowdus Drug Co., but will be completely remodeled to suit the requirements of the supply company.

Officers of the company who will move to Dallas include William J. Morris, president; F. L. Brinegar, assistant to the president; E. M. Mayer, vice president and treasurer; B. K. Kelly, assistant treasurer; C. A. Gutgesell, assistant treasurer; C. H. Meyer, manager of sales; A. J. Olson, manager machinery sales, and H. E. Spencer, director of purchases.

Control of Manchukuo Aids Japan's Oil Plans

With the creation of the State of Manchukuo and subsequent developments, the dominant influence of Japan in the Far East has been enhanced and that of Russia proportionately weakened, according to V. R. Garfias, manager, foreign oil division, H. L. Doherty & Co. Formerly Russia held a privileged position in this region with the building and joint ownership of the Chinese Eastern Railway through Manchuria, which provided a route from Vladivostok to western Russia some 500 miles shorter than the Transiberian Railroad skirting in Russian territory, the northern boundary of Manchuria.

Mr. Garfias' survey states: "Japan controlled before the organization of Manchukuo all the territory bordering on the Sea of Japan, with the exception of northern Sakhalin Island and Siberia, but with the control of Manchukuo and the absorption of the Chinese Eastern Railway into the Manchukuo Railroad system even these Russian outposts have been placed in a most vulnerable position.

"The importance to Japan of a dependable and easily accessible oil supply is apparent when one realizes that this country, largely dependent on maritime traffic for its commerce and national defense, consumes about 10,000,000 bbls. of oil yearly, of which less than 2,000,000 bbls. is produced within the country, the balance or 8,000,000 bbls. being imported largely from the fields of Dutch East Indies and the United States. It should be noted at this point that the oil fields in Russian Sakhalin, owned and operated jointly by Japan and Russia, produced in 1932 close to 2,000,000 bbls., and that the absolute control by Japan of this oil supply situated not more than 100 miles from Japanese territory is obviously vital.

"As part of the program of national defense, the Japanese government is now contemplating the establishment of an oil monopoly which includes the granting of government subsidies to Japanese oil companies in order to make Japan free from dependence on other nations for its oil supply.

"The southern point of Sakhalin Island is separated from the Japanese island of Jesso by a strait about 25 miles wide. The island extends north for about 700 miles. That portion north of the fifieth parallel, comprising somewhat more than half the island, is Russian territory, while the territory to the south —known also as Karafuto—is under the sovereignty of Japan. The population of northern Sakhalin is estimated at about 18,000 and that of Karafuto at about 280,000.

The oil fields of Sakhalin are located along the northeastern coast. Oil indications or favorable structures have been reported at Okha, Ekhabi, Piltun, Nutovo, Chaigo, Nyivo, Ouiglekouti, Kantangli, Liangeri and Goromai. At present the only commercially productive field in Okha which lies between Baikal and Urkt Bays and is connected by a wagon road, with the loading terminal at Moskalvo in the northeastern shores of Baikal Bay. A 6-inch oil pipe line runs from the Okha Field to Moskalvo, a distance of 15 miles.

ROYAL ROYALTIES RE-ELECTS

Stockholders of Royal Royalties, Ltd. at their annual meeting in Denver on June 6, re-elected Max W. Ball, H. T. Whitaker, Warwick M. Downing, Ross L. Heaton, and Harry W. Oborne as directors. The directors re-elected Max W. Ball president, H. T. Whitaker vice president, and J. L. Hartsfield secretary and treasurer. The company, directly and through Royal Syndicate No. 1, owns royalties in Oklahoma, Kansas, New Mexico and Colorado.

PIPE LINE TAX VETOED

AUSTIN, Tex., June 20.—Governor Ferguson Tuesday vetoed the bill placing oil pipe lines under the intangible tax assessment law and another amending the penal law handling oil in violation of proration that would have made it effective now instead of August 31.

Doubt East Texas Can Be Held to Allowable; Measure Imposing Penalties Is Still Required

By L. E. BREDBERG

DALLAS, Tex., June 19.—East Texas received two items of good news during the week; one a decrease in the allowable, the other an increase in price. A new proration schedule has not yet been issued due to the fact that the engineers of the railroad commission are still working on details in connection with the new allowables. At present the wells are curtailed to two-thirds of their past allowable. The new schedule will place a daily allowable of around 573,000 bbls. per day for the field, or 10 per cent of the hourly potential as figured from potentials shown by tests made on some 200 key wells a couple of weeks ago. The new order went into effect at midnight, June 13.

Scouts in the field report about 90,000 bbls. of the oil still being produced above the allowable. Another "fly in the ointment" is "back allowable" oil. Many companies have filed petitions for permits to run back allowable oil, which is now running from 20,000 to 38,000 bbls. per day, and showing good chances of being increased as the commission grants permits to run more of it.

Many of the major purchasers still doubt the possibility of the railroad commission's power to stop overproduction in this field, something which they have not yet accomplished, and until a penalty is placed on overproduction there seems to be no fear shown by some of the larger overproducers of being penalized for ignoring proration orders. If the oil penalty bill, passed by the state legislature and senate, had been signed by Governor Ferguson, field men of the commission no doubt would have little trouble in enforcing the present orders of the commission. But that bill remains unsigned. It will become effective 90 days after adjournment of the legislature regardless of whether it is signed by the governor. In the meantime violators may elect to ignore the present orders curtailing production.

Receivership Decision

The State has been filing receivership petitions against violators in the field, but the Sixth Court of Civil Appeals, sitting at Texarkana, June 17, ruled against the commission and the attorney general's department. The commission claimed it should be permitted, through its own receivers, to safeguard orders it had made and prevent violations rather than take action after violations of orders.

The court drew a distinction concerning the right of the State to appoint receivers to take charge of properties of alleged violators, reversing a former decision on the ground that the remedy of receivership was not allowed to the railroad commission before, but only after validity of its orders has been finally adjudicated. This may release several receiverships which the commission has obtained to date, and if so, will weaken the authority of the commission.

The same court affirmed decisions against producers who had been accused of failure to pay gross production tax. This decision may be used by the commission later as a club over the head of violators, particularly those not especially diligent in paying taxes on the oil they produce. Records of all violators may be scanned closely by the commission in an effort to catch failure to pay full taxes.

New Outlet

The Barnsdall Pipe Line Co. of Texas, subsidiary of the Barnsdall Oil Corp., has been organized to operate a gathering system and loading rack in Gregg County. Crude will be shipped to the latter's refineries in Oklahoma, and will probably take crude from other than its own leases in the field.

Purchasing companies which have been taking on new connections during the past two months are expected to slow down in making new connections since the price has been boosted, but with only from 15 to 20 wells being completed each week it is believed all new wells will be given connections.

Completions and Locations

There were 19 wells completed in the field this week; 23 new locations were staked, a slight increase. Two wildcat locations were staked; one wildcat was abandoned.

The wildcat of Fred Prince, Peveto and others on the E. L. Phillips farm, 2 miles southwest of Talco in Franklin County, was given up as a dry hole at 3,387 feet. It logged salt water from 2,925-31 feet. This eliminates this interesting fault zone area from producing from the Woodbine sand, and will probably check further testing for the present. The area has been closely watched, much blocked and checkerboard acreage has been leased on the fault zone play, several tests being given up as failures in this and adjacent counties.

Freestone County is to get another wildcat test. Devonian Oil Co. has made location on the J. G. Beall farm in the Isaac Connelly Survey, 2 miles southwest of the town of Donie, and will drill a test to the Woodbine sand.

N. H. Hoffman and others have made location for their No. 1 H. Lennox in the John E. Edmondson Survey in Red River County. Ajo Oil Co. is spudding its No. 1 Nickels and Daniels in the Hugh B. Shaw Survey in this county.

Ed W. Bateman Drilling Co.'s No. 1 A. C. Carlisle, in the M. Elam Survey, in the northwestern part of Leon County, is now around 3,000 feet making exceptionally good time. This is in the most interesting wildcat area of East Texas at present as Shell Petroleum Corp. and others formerly encountered a good showing of oil in their test near Centerville, and are preparing to drill a second test.

Manning and Collin's No. 1 Bivens in the W. H. Bunch Survey, north of the Van Field, Van Zandt County, is standing shut down at 1,400 feet failing to make a showing in the Nacatosh sand, and will probably be abandoned at this depth. Cole and others' No. 1 Tunnell, in the M. Gross Survey, another shallow sand test, was abandoned at 1,385 feet this week. This shallow sand area has only two small Nacatosh sand producers, and has been punctured in several other places, failing to indicate a field of any importance.

COMPLETIONS IN EAST TEXAS

North Gregg County

Atlantic Oil Production Co.'s No. 40 Moores, top sand 3,514 feet, initial production 100 bbls. per hour through tubing, total depth 3,532 feet; No. 41 Moores, top sand 3,545 feet, initial production 84 bbls. per hour through open tubing, total depth 3,559 feet. P. R. Bonds' No. 1 T. Anderson, top sand 3,473 feet, initial production 50 bbls. per hour through open tubing, total depth 3,510 feet. Dyck Oil Co.'s No. 6 J. M. Christian, top sand 3,572 feet, initial production 105 bbls. per hour through open tubing, total depth 3,616 feet. Gulf Production Co.'s No. 7 F. M. Fonville, top sand 3,501 feet, initial production 80 bbls. per hour through open tubing, total depth 3,559 feet. A. D. King, trustee's No. 2 D. T. Lloyd, top sand 3,703 feet, initial production 120 bbls. per hour through open tubing, total depth 3,721 feet. Stanolind Oil & Gas Co.'s No. 5 Meadows, top sand 3,705 feet, initial production 45 bbls. per hour through 1-inch tubing choke, total depth 3,720 feet. Superior Oil Co.'s No. 15 Ingram, top sand 3,513 feet, initial production 55 bbls. in one-fourth hour through open tubing, total depth 3,586 feet.

South Gregg County

Gulf Production Co.'s No. 13 Muckelroy, top sand 3,578 feet, initial production 57 bbls. per hour through open tubing, total depth 3,600 feet. Island Oil Co.'s No. 5 Register, top sand 3,644 feet, initial production 120 bbls. per hour through open tubing, total depth 3,663 feet. Tide Water Oil Co.'s No. 10 Hughey, top sand 3,460 feet, initial production 40 bbls. per hour through open tubing, total depth 3,475 feet.

North Rusk County

Humble Oil & Refining Co.'s No. 8-A H. Sexton, top sand 3,720 feet, initial production 80 bbls. per hour through three-quarters inch tubing choke, total depth 3,751 feet. Jackson-Wise and Markham's No. 4 Christian, top sand 3,738 feet, initial production 55 bbls. in one-quarter hour through open tubing, total depth 3,750 feet. W. S. Randall's No. 2 Buntyn, top sand 3,690 feet, initial production 95 bbls. per hour through open tubing, total depth 3,730 feet. Tide Water Oil Co.'s No. 5 F. L. Buntyn, top sand 3,657 feet, initial production 12 bbls. in 10 minutes through open tubing, total depth 3,675 feet.

South Rusk County

Cullen Oil Co.'s No. 1 A. Thrash, top sand 3,695 feet, initial production 40 bbls. per hour through 2-inch tubing, total depth 3,717 feet. Humble Oil & Refining Co.'s No. 19-A S. A. Plowman, top sand 3,681 feet, initial production 87 bbls. per hour through three-quarters inch tubing choke, total depth 3,751 feet.

Smith County

Walter M. Young and others' No. 1 Gus Stone, top sand 3,978 feet, initial production 60 bbls. per hour through open tubing, total depth 3,979 feet.

Upshur County

Roeser & Pendleton's No. 3 E. G. Evans, top sand 3,681 feet, initial production 75 bbls. per hour through open tubing, total depth 3,712 feet.

Van Zandt County

Petroleum Pipe Line Co.'s No. 2 Mrs. S. McGee, top sand 1,245 feet, initial production 12 bbls. per day pumping, total depth 1,264 feet.

Pure Oil Co.'s No. 6 H. P. Tunnell, initial production first 24-hour gauge after choked for proration, total depth 2,935 feet.

East Central Texas Wildcats

Week Ending June 19

ANGELINA COUNTY

Company, well, farm name, section and block—	Remarks
LaRue-Smith et al's No. 1 J. Perkins, center of W 22 acres of J. Perkins 55-ac. tract, Antonio Flores Sur.	Drlg. 1,050 ft.

FRANKLIN COUNTY

Fred Prince et al's No. 1 E. L. Phillips, 1,110 ft. from W line and 330 ft. from N line of survey, W. Birdwell Sur.	Preparing to abandon; T.D. 3,387 ft.; cored water sand 2,925-31 ft.

FREESTONE COUNTY

Clyde Creighton's No. 1 Holley Bros., 554 ft. from W line and center of N and S lines of lease, A.B.M. Sur.	Drlg. 3,775 ft.
Devonian Oil Co.'s No. 1 J. G. Beall, 330 ft. out of SE cor. of 220-ac. tract, 2 miles SW of Donie, Isaac Connelly Sur.	Derrick.

GREGG COUNTY

Columbia Oil & Gas Co.'s No. 2 T. Snoddy, 350 ft. from N line and 2,150 ft. from E line of survey, W. H. Castleberry Sur.	Rig up.
East Texas Refining Co.'s No. 4 D. Caldwell, 2,030 ft. from N line and 2,629 ft. from E line of survey, J. Ruddle Sur.	Waiting on cmt. to set; T.D. 3,502 ft.
East Texas Refining Co.'s No. 6 F. White, 330 ft. from N line of lease, 660 ft. E of No. 5, H. Edwards Sur.	Drlg. 3,089 ft.
Gulf Production Co.'s No. 11 Muckelroy, 3,600 ft. from S line and 130 ft. from S line of survey, J. S. Carrithers Sur.	Drlg. 2,558 ft.
Gulf Production Co.'s No. 25 M. O. Sheppard, 1,785 ft. N and 680 ft. E of most westerly SW cor. of lease, G. B. Rains Sur.	Derrick.
Magnolia Petroleum Co.'s No. 9 O. F. Smith, 5,050 ft. from N line and 1,980 ft. from E line of survey, H. Edwards Sur.	Bldg. derrick.
Manzelli and Reynolds' No. 1 Mrs. Compton, 30 ft. from S line and 150 ft. from W line of Blk. No. 30, H. R. Hokit Sur.	Rig up.
J. Niblack's No. 1 S. Carr, 500 ft. from S line and 550 ft. from W line of survey, M. McCurry Sur.	Drlg. 1,525 ft.
Rainey et al's No. 1 State, 5,220 ft. from N line and 1,100 ft. from W line of P. McAnally Sur.	Swabbing; T.D. 3,515 ft.
Rosier and Pendleton's No. 6-A Nicholson, 363 ft. from S line and 330 ft. from E line of lease, M. Mann Sur.	Drlg. 2,205 ft.
Shell Petroleum Corp.'s No. 7 Bates, 5,650 ft. from N line and 3,270 ft. from W line of survey	Rig up.
Sinclair Prairie Oil Co.'s No. 15 A. A. Lockhart, 157 ft. from N line and 3,020 ft. from W line of survey, A. Norris Sur.	Rig up.
Sun Oil Co.'s No. 4 E. Smith, 1,980 ft. from N line and 330 ft. from W line of survey, M. Scott Sur.	Drlg. 2,985 ft.

(Continued on Page 31)

Second Producer Is Completed in Jones County; North Texas and Panhandle Wells Saved

By L. E. BREDBERG
Fort Worth Bureau, The Oil and Gas Journal

FORT WORTH, Tex., June 19.—There were no locations staked in the district during the week. Four producers were completed, one in Jones, one in Glasscock and two in Ward County. Van Horn Oil & Gas Co.'s No. 1 Hall, in Culberson County, has been abandoned at 2,670 feet, although the hole has not been plugged. It may be carried deeper.

Wahlenmaier and others' No. 1 Monroe in Section 41, Block 1, I.&G.N. Survey, south of the Yates Pool, Pecos County, has been abandoned. Total depth is 2,323 feet.

Big Lake Field

Group No. 1 Oil Corp.'s No. 7-B University, in Section 36, Block 9, in the center of the deep producing area in the Big Lake Field, Reagan County, is showing as a dry hole at this writing. It was drilled to 8,750 feet in the Ordovician lime, making but little oil and 75 bbls. of salt water per hour. This may be considered surprising to many, but when other producers surrounding this well are considered there is no doubt that the area may have been drained. One nearby well has taken out 3,000,000 bbls. of oil, and two other wells in the same area have taken out around 2,000,000 bbls. each. This was cited as the reason for this well not showing as a good producer when the Ordovician was logged. However, it may drill deeper and pick up a deeper and heavier pay horizon than the wells which surround it.

Jones County

Condor Petroleum Co. completed another producer on its 2,500-acre block in Jones County this week, the second well for a pool which is approximately 5 miles from the nearest production. The well is in Section 4, Block 20, T.&P. Survey. It made 275 bbls. on initial flow from sand logged at 1,932-38 feet.

This company opened production in this pool, in southeastern Jones County, six months ago, but due to the low market for crude other tests were not drilled. The oil is trucked to a nearby refinery.

Howard County

Harrison and others' No. 1 Rhotan, in Section 4, Block 30, Township 1s, T.&P. Survey, a mile northwest extension well to the Dodge-Denman Pool, eastern Howard County, was plugged back and shot with 350 quarts. It flowed 60 bbls., then bridged and is now cleaning out. It is showing as a small producer, conceded to be an edge marker for this small producing area. It encountered its first showing at 2,525 feet, and a second at 2,660-80 feet, showing water a little deeper, causing it to be plugged back to shut off the water.

Ector County

Cherry and others' No. 1 Johnson, in Section 41, Block 43, Township 2s, T.&P. Survey, Ector County, appears as the next well to be completed in the Cowden-Addis areas. It is drilling near 4,000 feet in lime and will mark an extension to the two areas, becoming a potential connecting well for the areas if it produces. Waggoner-Western's No. 1 Addis, in Section 35, Block 43, Township 2s, T.&P. Survey, southeast of the Addis discovery well, is drilling below 3,725 feet in lime, another test due to be completed within 10 days.

WICHITA FALLS AND PANHANDLE

The boosting of the crude price in this district prevented the abandonment of many wells which have been producing as strippers for a long time. Much of the crude in this district is above 36 and up to 40 degrees and above. Many wells have been shut in during the past two months of distressing prices.

The recently discovered Jean Pool of Young County is now being connected to by the Texas Pipe Line Co. line. A 3-inch line is being laid to the pool, the first connection for the three high gravity 700-foot producing wells. The pool is in Block 1,365, T.E.&L. Survey.

Pipe line runs in the district dropped an average of 2,650 bbls. per day this week to 45,695 bbls.

Prices in the Panhandle district were also increased, a boon to this district in which activities have been held to a minimum during the past year because of low prices.

Culberson County

Van Horn Oil & Gas Co.'s No. 1 Hall, dry and abandoned, total depth 2,670 feet, hole not plugged.

Glasscock County

Humble Oil & Refining Co.'s No. 1 Washer, top pay 2,120 feet, initial production 558 bbls. of oil per day on proration test, total depth 2,121 feet.

Pecos County

Wahlenmaier and others' No. 1 Monroe, dry and abandoned, total depth 2,323 feet.

Ward County

Prince Brothers' No. 2 Hall-Roberts, top pay 2,405-12 feet, initial production 80 bbls. per day flowing through tubing, total depth 2,475 feet. Sturms-Simms Oil Co.'s No. 4 Jones, top pay 2,515-25 feet, increase 2,586-91 feet, initial production flowing through tubing 75 bbls. per day, total depth 2,620 feet.

Jones County

Condor Petroleum Co.'s No. 1 Holt, sand 1,932-38 feet, initial production 275 bbls. flowing, total depth 1,938 feet.

COMPLETIONS IN PANHANDLE

Gray County

Dolomite Production Co.'s No. 1 M. E. Sailor, top pay 3,133-3,215 feet, shot 280 quarts 3,120-3,235 feet, initial production 108 bbls. oil daily, total depth 3,230 feet. Texas Co.'s No. 4 Combs-Worley, old well drilled deeper, old total depth 3,005 feet, new total depth 3,055 feet, initial production 297 bbls. per day, increase in oil at 3,044-48 feet.

Wildcat Operations in West Texas

Week Ending June 19

CONCHO COUNTY

Company well, farm name, section and block—	Remarks
Beasley et al's No. 1 Waring Estate, 490 ft. from N and E Sec. 163, T.&N.O. Sur.	T.D. 2,586 ft.; pumping 5 bbls oil per day and some water.

CRANE COUNTY

Loffland Bros.' No. 1 Tubbs, 1,324 ft. from N line and 1,320 ft. from W line of Sec. 9, Blk. B-27, P.S.L. Sur.	Drlg. 355 ft.

CULBERSON COUNTY

Miller Bros.' No. 1 fee, 1,980 ft. from N line and 660 ft. from E line of Sec. 61, Blk. 97, P.S.L. Sur.	Drlg. 1,024 ft.

ECTOR COUNTY

Cherry et al's No. 1 Johnson, 1,320 ft. from S line and 660 ft. from E line of Sec. 41, Blk. 43, Twp. 1s, T.&P. Sur.	Drlg. 3,926 ft.
L. C. Harrison et al's No. 1 Addis, 330 ft. from N and 1,320 ft. from W, Sec. 35, Blk. 43, Twp. 2s, T.&P. Sur.	Flowing average of 275 bbls. oil per day to tanks; T.D. 4,061 ft.
Landreth Prod. and The Texas Company's No. 1 Holt, 660 ft. from S line and 2,025 ft. from E line of Sec. 16, Blk. 43, Twp. 1s, T.&P. Sur.	T.D. 4,450 ft.; plugged back to 4,385 ft.; shot 150 qts. 4,339-30 ft.; swabbed and flowed 105 bbls. of oil.
Thomas et al's No. 1 Edwards, 330 ft. from S, 2,310 ft. from E, Sec. 38, Blk. 43, Twp. 2s, T.&P. Sur.	Set casing at 3,327 ft.
Fred Turner's No. 1-A Addis, 1,650 ft. from N line and 2,200 ft. from E line of Sec. 35, Blk. 45, Twp. 2s, T.&P. Sur.	Drilling plug 3,687 feet.

FISHER COUNTY

Cranfill & Reynolds' No. 2 George, 330 ft. from N and W lines of NE of Sec. 300, Blk. 1, B.B.B.&C. Sur.	Drlg. 2,350 ft.
Southern Oil Co.'s No. 1 Beavers, 330 ft. from W and 660 ft. from S of S half of SW Sec. 193, B.B.B.&C. Sur.	S.D. 2,910 ft.

GARZA COUNTY

F.H.E. Oil Co.'s No. 1 Stoker	T.D. 2,909 ft.

GLASSCOCK COUNTY

Humble Oil & Refining Co.'s No. 1 Washer, 330 ft. from N line and 330 ft. from E line of Section 20, Blk. 33, Twp. 2s, T.&P. Sur.	1,900 ft. oil in hole; S.D.; T.D. 2,121 ft.

HOWARD COUNTY

M. D. Bryant et al's No. 1 L. C. Denman, 2,310 ft. from S and W lines of Sec. 10, Blk. 30, Twp. 1s, T.&P. Sur.	Drlg. 2,675 ft.
Eppenauer et al's No. 1 Leatherwood, C of SE of NW, Sec. 35, Blk. 33, Twp. 1n, T.&P. Sur.	Material on ground.
L. C. Harrison's No. 4 L. C. Denman, 2,370 ft. from the E line and 2,325 ft. from S line of Sec. 10, T.&P.R.R. Sur., Blk. 30, Twp. 1s	Waiting on cmt. to set 3,008 ft.
Jack Wallace et al's No. 1 Scott, 990 ft. from N and 330 ft. from E lines of Sec. 93, Blk. 29, W.&N.W. Sur.	Shot 20 qts. 1,347-61 ft.; production estimated 5 bbls. of oil per day; T.D. 1,367 ft.

JONES COUNTY

Dyer's No. 1 Odom, 200 ft. from S and 170 ft. from W of N 320 acres, G. Zumwalt Sur	S.D. 250 ft.

LOVING COUNTY

Eppenauer Drlg. Co.'s No. 1-A Victor, 330 ft. from SW and 335 ft. from SE of NW of N half Sec. 4, Blk. 2, W.&N.W. Sur.	Rigging up standard tools

PECOS COUNTY

A. & M. Pet. Co.'s No. 1 University, 1,725 ft. from S line and 330 ft. from E line of Sec. 31, Blk. 16, University Sur.	Drlg. 1,236 ft.
Humble Oil & Ref. Co.'s No. 1 White-Baker Co., 1,320 ft. from N and E lines of Sec. 44, Blk. 2, T.C.R.R. Sur.	S.D. 1,715 ft.
Kimberlin et al's No. 1 R. D. Gregg, 3,465 ft. from NW and 150 ft. from NE, Sec. 101, Blk. 10, H.&G.N. Sur.	S.D. 1,200 ft.

REAGAN COUNTY

Big Lake Oil Co.'s No. 8-C University, 710 ft. from S and 2,410 ft. from E, Sec. 12, Blk. 2	Flowed 2,078 bbls.; T.D. 4,880 ft.
Big Lake Oil Co.'s No. 9-C University, 2,410 ft. from N and 765 ft. from E, Sec. 12, Blk. 2	Flowed 2,074 bbls.; T.D. 8,647 ft.
Big Lake Oil Co.'s No. 10-C University, 2,035 ft. from S and 375 ft. from W, Sec. 25, Blk. 9	Drlg. 8,174 ft.
Big Lake Oil Co.'s No. 11-C University, 1,300 ft. from S line and 2,140 ft. from E line, Sec. 13, Blk. 2, University Sur.	Drlg. 5,382 ft.
Continental Oil Co.'s No. 7-B University, 1,900 ft. from N and 660 ft. from W, Sec. 36, Blk. 9	Drlg. 8,700 ft.
Continental Oil Co.'s No. 8-B University, 1,300 ft. from S and 1,775 ft. from W, Sec. 36, Blk. 9	T.D. 8,695 ft.; flowed 2,631 bbls.

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ROCKY MOUNTAIN AREA

Estimated daily production for the week ending June 17 follows:

WYOMING	
Salt Creek	19,150
Big Muddy	1,820
Badger Basin	40
Byron-Garland	230
Byron-East	0
Dallas Derby	520
Dutton Creek	40
Elk Basin	569
Ferris	640
Frannie	240
Grass Creek	180
Greybull	0
Hamilton Dome	850
Hudson	370
LaBarge	790
Lance Creek	200
Lost Soldier	1,990
Mule Creek	shut in
Midway	70
Notches	shut in
Oregon Basin	250
Osage	800
Pilot Butte	30
Rex Lake	shut in
Rock River	1,170
South Casper	shut in
Poison Spider	120
Teapot	20
Warm Springs	0
Total	30,089
MONTANA	
Buckley-Border	360
Cat Creek	720
Cut Bank	1,120
Dry Creek	1,120
Kevin-Sunburst	3,000
Lake Basin	50
Pondera	890
Total	7,270
COLORADO	
Florence	180
Fort Collins and Wellington	580
Iles Dome	550
Moffatt	530
Orchard	160
Rangely	80
Tow Creek	260
Total	2,340
NEW MEXICO	
Artesia	530
Cooper area	70
Empire area	0
Eunice area	550
Getty Pool	0
Hobbs	28,810
Hogback	210
Hospah	shut in
Jal	1,540
Lea area	2,140
Jackson	660
Maljamar	230
Rattlesnake	670
Table Mesa	80
Total	35,490
Total all fields	75,189
Previous week	73,620
Difference	1,560

New Association Formed by Oil Men in Arkansas

SHREVEPORT, La., June 19.—At a meeting in the offices of the Lion Oil Refining Co. in El Dorado, Arkansas, operators, refiners and others interested in the oil industry in Arkansas formed the Independent Oil and Gas Association of Arkansas which supersedes the Independent Petroleum Association of Arkansas. Joe K. Mahoney, J. W. Olvey and J. D. Trimble of Ed Dorado, were appointed a committee to prepare a code of practice for the producing phase of the industry and J. W. Olvey and Col. T. H. Barton, of the Lion Oil Refining Co., were sent as observers to Chicago to attend the conference on the industrial recovery bill. They will not attend as delegates having a vote in the conference but merely because of lack of the new organization's information on the measure, as observers to report back. J. E. Shatford, Ouchita Valley Refining Co., of El Dorado, is president of the new group; J. D. Trimble, vice president, and C. E. Murdock, independent operator, secretary-treasurer. Directors in addition to these are P. R. Mattocks, Joe Mahoney, T. H. Barton, C. H. Murphy and C. E. Murdock.

D. W. Harris, vice president of the Arkansas Natural Companies (Cities Service), H. C. Walker, local counsel for the same organization, and James H. Dugan, independent operator, were sent to the Chicago conference by the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association to represent the industry in this territory.

Shreveport Geologists Plan Annual Field Trip

SHREVEPORT, La., June 19.—The Shreveport Geological Society will sponsor its tenth annual field trip, starting from Monroe, La., the morning of July 8, by bus. The first day of the tour will be occupied in a study of the Cockfield and Jackson formations exposed in the bluffs along the Ouachita River at the famous localities described by Harris and Veatch. The Danville Landing locality described by Howe and Wallace will be visited, as well as the Rosefield locality where the complete Oligocene section of Louisiana is exposed.

The trip will be of particular interest to geologists and micropaleontologists since a complete exposure from the base of the Moodys Branch mark (Diboll zone) to the top of the Oligocene may be seen. Ample time will be given at every outcrop so that sample collections may be made, and maps and sections of the area also will be available. Noon lunches on the two days of the trip will be provided in the field. Virginia Hotel, Monroe, will be headquarters during the one night of the trip and geologists of Louisiana and Arkansas, as well as Texas, to whom a general invitation is extended, are asked to advise D. N. Jolly, 203 Ward Building, or Roy T. Hazzard, Box 1731, Shreveport.

ENLARGED SPACING COMMITTEE

An enlarged topical committee on well spacing of the central committee on drilling and production practice for the division of production of the American Petroleum Institute has been appointed, with T. V. Moore, of the Humble Oil & Refining Co., Houston, as chairman. Mr. Moore succeeds Fred E. Wood of the Standard Oil Co. (Indiana), Chicago, as chairman of the expanded committee. Other members of the committee, which functions under the central committee headed by H. N. Marsh, include Stanley Gill, Houston; F. E. Heath, Dallas; D. R. Knowlton, Bartlesville; G. V. D. Marx, San Francisco; K. B. Nowels, Bradford, Pa.; C. E. Reistle, Jr., U. S. Bureau of Mines, Bartlesville; L. C. Uren, University of California, Berkeley; H. D. Wilde, Jr., Houston; R. D. Wycoff, Pittsburgh, and J. J. Zorichak, Tulsa.

Text of the New Production Regulations Are Announced for East Texas Field

AUSTIN, Tex., June 19.—The special order regulating production in East Texas issued by the State Railroad Commission, effective June 14, contains the following provisions:

It is ordered that no owner, operator or manager shall produce from any well an amount of oil in any one calendar day in excess of 10 per cent of the average hourly potential producing capacity of said well. Provided that no well shall be restricted by the operation of this order to a production of less than 20 bbls. of oil during any calendar day.

Owners and operators of wells which are completed after the beginning date of this order, shall, upon the completion of said wells, notify the resident engineer of the Railroad Commission at Kilgore, Tex., of the completion of said well. The commission will, upon the receipt of such notice, cause to be made an actual test to determine the average hourly potential producing capacity of said well, if in the opinion of the commission such test be necessary; or if in the opinion of the commission sufficient information is in the possession of the commission to indicate in a substantially accurate way the average hourly potential producing capacity of said well, then such well shall be permitted to produce 10 per cent of the average potential producing capacity of said well as fixed by the commission. No well from and after its completion shall be permitted to produce until its average hourly potential producing capacity has been so determined.

Purpose of Order

The purpose of the commission is to adopt and enforce a conservation order fair and equitable in its operation and to that end to provide such a method of allocating the production in the field as will recognize and give effect to the distinctive characteristics of the various wells in the field, so far as can be done. The commission recognizes the difficulty of such task and that it is difficult, if not impracticable, to lay down in advance a general, inflexible rule governing the method of allocating the allowable that will in all cases give proper effect to actual differences in the productive capacity of different parts of the field and the various wells therein. Accordingly, as a part of the method of effecting the distribution of the allowable and for the purpose of and with the intent to make the distribution fair and equitable, it is provided, and the commission hereby declares such to be its intent and desire, that the supervisor in charge of said field, upon written application made by the owner or operator or manager of any well or wells, or the duly authorized agent of either, may grant exception or exceptions to the order where such is necessary to do equity and prevent arbitrary and/or unreasonable discrimination as between different wells in the field. No exception, however, shall be granted except upon written application to the commission supported by the affidavit of one or more of the parties above mentioned, detailing the existence of all facts upon which the exception should be based and expressly affirming the bona fide belief on the part of the affiant that such facts exist; such exception or exceptions shall not take effect until approved by the commission. The affidavit or affidavits above mentioned shall not be conclusive as to the existence of any or all of the facts therein detailed and the commission shall be permitted to do any and all things reasonably necessary to affirmatively establish or refute the existence of such facts, and no exception shall be granted until and unless the commission shall determine that the method of allocating the allowable does not give proper effect to actual differences in the productive capacity of the various wells; that is to say, no exception shall be granted except to better carry out the general purpose of the order which is to conserve the natural resources existing in the East Texas Field without discriminating against any one or more wells in the field in favor of any one or more wells, but on the contrary to give proper recognition to actual differences in the productive capacity of each well.

For the purpose of making necessary adjustments, if any, to eliminate arbitrary and unreasonable discrimination, the commission hereby declares that upon proof that the finding of the average hourly potential of any well or wells in said field is erroneous to the extent of causing or tending to cause arbitrary and unreasonable discrimination, such orders will be entered as will eliminate such discrimination.

To Consider Changes

It is further declared to be the intent and purpose of the commission to consider each well in the field separately and individually and permit, without the necessity of changing this order as a whole, by such orders as may be necessary, the production from such well, of sufficient oil to recognize and give effect to the actual difference in the productive capacity of such well as compared to any other well or wells in the field.

It is further declared to be the intent and purpose of the commission to permit, upon application, the drilling of any well or wells in the East Texas Field in order to prevent waste, to protect vested rights and to protect any owner, operator or manager of any well in the East Texas Field against drainage by the well or wells of any other owner, operator or manager and/or to eliminate any inequity now existing or which may hereafter exist as between any well or wells in said field.

Rule 1, Section (a) of the order of January 31, 1933, modifying and readopting Rule 37, is amended as follows:

Rule 1: (a) Rule 37, adopted November 26, 1919, is hereby amended in so far as it applies to the East Texas Field so as to hereafter read as follows: "No well shall hereafter be drilled for oil or gas at any point less than 660 feet from any drilling or completed well; and no well shall hereafter be drilled for oil or gas at any point less than 330 feet from any property or division line; provided, however, the commission in order to prevent waste, or to protect vested rights, or to protect any property against undue drainage by reason of the operation of the wells of any other operator, will, after hearing, grant exceptions permitting drilling within a less or shorter distance than hereinabove prescribed, upon application duly filed fully stating the facts, notice of such application and hearing having been first given to all adjacent lessees affected thereby; provided, that if all adjacent lessees affected thereby waive in writing notice of hearing on or objection to the granting of said application, the commission may proceed to determine such application without hearing; and, provided further that in cases of forced offsets the commission may grant exceptions without waivers or hearing when it is evident that the wells desired are necessary to protect the properties on which it is proposed to drill them."

Act Makes Important Changes in Tax Free Sales

(Continued from Page 17)

or importer in the amount of tax paid by him under this title with respect to the sale of any article to a dealer, if the manufacturer, producer, or importer has in his possession such evidence as the regulations may prescribe that (A) such article has after the date this paragraph takes effect been delivered by the dealer to a state or political subdivision thereof for use in the exercise of an essential governmental function and (B) the manufacturer, producer or importer has repaid or agreed to repay the amount of such tax to the dealer or has obtained the consent of the dealer to the allowance of the credit or refund.'

"Section 5. Effective 15 days after the date of the enactment of this act, Title 4 of the Revenue Act of 1932 is amended by adding at the end thereof a new section to read as follows:

"'Section 630. Exemption From Tax of Certain Supplies for Vessels.

"'Under regulations prescribed by the commissioner, with the approval of the secretary, no tax under this title shall be imposed upon any article sold for use as fuel supplies, ships' stores, sea stores, or legitimate equipment on vessels of war of the United States or of any foreign nation, vessels employed in the fisheries or in the whaling business, or actually engaged in foreign trade or trade between the Atlantic and Pacific ports of the United States or between the United States and any of its possessions. Articles manufactured or produced with the use of articles upon the importation of which tax has been paid under this title, if laden for use as supplies on such vessels, shall be held to be exported for the purposes of Section 601 (b).'"

MARSH GAS BAN

The California State Railroad Commission has issued an order forbidding P.G.&E. to mix marsh gas with the Kettleman Hills product when serving customers at Stockton and Sacramento. The company owns a number of the old marsh gas wells close to these two cities. The commission based its order upon the fact that the mixed product has a lower B.t.u. content and that the supply from Kettleman Hills is abundant to serve all customers.

East Central Texas Wildcats

(Continued from Page 29)

A. L. Slaughter's No. 1 R. B. White, 440 ft. from N line and 30 ft. from E line of survey, C. H. Alexandria Sur. ..... Rig up.

Superior Oil Co.'s No. 16 Ingram, 1,800 ft. from N line and 1,450 ft. from W line of survey, W. E. Pasteur Sur. ..... Drlg. 1,690 ft.

Superior Oil Co.'s No. 4-B Pritchard, 3,050 ft. W and 500 ft. N of SW cor. of William Pasteur Sur. ..... Derrick.

Tide Water Oil Co.'s No. 7 T. Bell, 1,700 ft. from N line and 2,600 ft. from W line of survey, G. F. Penn Sur. ..... Rig up.

Towns' No. 1 Leak, 100 ft. from S line and 260 ft. from W line of survey, B. W. Witcher Sur. ..... Drlg. 2,660 ft.

Yeager et al's No. 1 Howard, 660 ft. E of Harry Lewis' No. 1 King, Mary Scott Sur. ..... Drlg. 2,725 ft.

Yount Lee Oil Co.'s No. 7 V. Calvin, 330 ft. from E line of lease and 535 ft. from Nos. 1 and 3, H. Hathaway Sur. ..... Swabbing; T.D. 3,601 ft.

Yount Lee Oil Co.'s No. 4 M. M. Custer, 330 ft. from N line of lease and 669 ft. E of No. 1, J. Skillern Sur. ..... Running csg.; T.D. 3,548 ft.

HENDERSON COUNTY

McElreath and Suggett et al's No. 1 Ferguson, 330 ft. out of most southerly NW cor. of 252.8-ac. tract, William P. Wyche Sur. ..... Derrick.

HILL COUNTY

Spikes et al's No. 1 Holman, 150 ft. from NW cor. of 100-ac. tract, one-half mile S of Mt. Calm, Latham Sur. ..... Rig up.

HOPKINS COUNTY

E. P. Coley's No. 1 Jumper ..... S.D. 1,630 ft.
Culberson & Lynch's No. 1 Louis Stribling, 150 ft. from NW cor. of tract and lease, Thomas Morris Sur. .. Rig up.
Delworth-Hogan and Ashby's No. 1 Logan, 250 ft. from S and E lines of 175-ac. tract, A. L. Wetman Sur. .. Rig up.
Pete Wiggins et al's No. 1 fee, 400 ft. from S line and 587 ft. from W line of 48-ac. tract, Nacogdoches University Lands Sur. ..... Set surface csg.; T.D. 165 ft.

HUNT COUNTY

Solar Exploration Co.'s No. 1 Smith, 210 ft. from E line and 370 ft. from S line of lease, William Glass Sur. ..... T.D. 1,500 ft.
Solar Exploration Co.'s No. 1-A N. A. Gregory, 150 ft. from W line and 450 ft. from S line of lease, William Glass Sur. ..... Drlg. 800 ft.

LEON COUNTY

Bateman et al's No. 1 A. C. Carlyle, 150 ft. out of NE cor. of survey, Mary Elem Sur. ..... Drlg. 2,200 ft.
Shell Petroleum Corp.'s No. 1 Boggs, center of 123.5-ac. tract, John Carter Sur. ..... Derrick.

LIMESTONE COUNTY

C. C. Curtis et al's No. 1 Emma Daniels, 150 ft. from W line and 150 ft. from S line of 42.5-ac. tract in Pedro Varela Sur. ..... Set surface csg. 60 ft.

RED RIVER COUNTY

Ajo Oil Co.'s No. 1 Nickels & Daniels, center of S 750 acres of 1,008-ac. tract, 8 miles N of English, Hugh B. Shaw Sur. ..... Spudding.

RUSK COUNTY

J. Boren's No. 3 A. Holt, 1,500 ft. from N line and 1,320 ft. from W line of survey, D. Clark Sur. ..... Rig up.
Combined Oil Co.'s No. 14 G. W. Eaton, 330 ft. from S line and midway between Nos. 6 and 9, F. Cordova Sur. ..... Derrick.
Cordova Union Oil Co.'s No. 1-D C. O. Christian, 1,490 ft. from N line and 1,880 ft. from W line of survey, D. Clark Sur. ..... Set surface csg. 109 ft.
Griffin & Barnes' No. 1 fee, 13 ft. from S and W lines of 3-ac. tract, J. B. De Cadena Sur. .. .. Waiting on cmt. to set.
Gulf Production Co.'s No. 7 C. H. Grissom, 4,760 ft. from S line and 4,800 ft. from W line of survey, F. Cordova Sur. ..... Derrick.
Gulf Production Co.'s No. 25 G. G. Turner, 3,180 ft. from N line and 5,808 ft. from W line of survey, F. Cordova Sur. ..... Derrick.
H. L. Hunt's No. 9-A H. C. Maxwell, 150 ft. from E line and midway between No. 1-A, F. Cordova Sur. .. Drlg. 1,981 ft.
Jordan & Ramsey's No. 1 L. W. Prier, 330 ft. from N line and 607 ft. from E line of 53-ac. lease, Walker Pettit Sur. ..... Drlg. 1,435 ft.
Lion Oil & Refining Co.'s No. 10-B H. Brooks, 5,520 ft. from S line and 1,420 ft. from E line of survey, M. J. Pru Sur. ..... Set surface csg. 150 ft.
Martin and Cockburn's No. 4 J. P. Cansler, 1,620 ft. from N line and 1,130 ft. from W line of survey, E. Collard Sur. ..... Rig up.
Mid-Kansas Oil & Gas Co.'s No. 1 Robert Van Zandt, 1,132 ft. S and 358 ft. E of SW cor. of Stanolind-Pure, Bas Lacy 100-ac. tract, J. H. Sparks Sur. .... Derrick.
Mid-Kansas Oil & Gas Co.'s No. 13 S. H. Moores, 3,300 ft. from E line and 790 ft. from S line of survey, M. J. Pru Sur. ..... Derrick.
Mid-Kansas Oil & Gas Co.'s No. 14 E. E. Moores, 140 ft. from S line and 3,260 ft. from E line of survey, M. J. Pru Sur. ..... Rig up.
Mid-Kansas Oil & Gas Co.'s No. 15 E. E. Moores, 3,720 ft. from E line and 660 ft. from N line of survey, J. B. De Cadena Sur. ..... Derrick.
Walker Murray et al's No. 1 W. H. Arnold, 330 ft. from S and W lines of 50-ac. tract, Levi N. Sparks Sur. ..... S.D. 1,525 ft.
Patterson Drlg. Co.'s No. 3 Brock Estate, 2,330 ft. from N line and 100 ft. from E line of survey, R. W. Smith Sur. ..... Derrick.
Shell Petroleum Corp.'s No. 12 W. P. Moore, 1,740 ft. from S line and 330 ft. from E line of survey, H. Wiggins Sur. ..... Rig up.
Snowden and McSweeney's No. 10 R. Laird, 330 ft. from N line and 1,400 ft. from W line of survey, W. P. Chisum Sur. ..... Waiting on cmt. to set 3,535 ft.
Tex-Jersey Oil Corp.'s No. 1 Gaston Ind. School, 100 ft. from S line and 4,550 ft. from W line of survey, M. J. Pru Sur. ..... Drlg. 2,940 ft.
Turman Oil Co.'s No. 7 Brightwell, 2,300 ft. from N line and 890 ft. from W line of lease, R. E. Winn Sur. ..... Running csg.; T.D. 3,453 ft.

SMITH COUNTY

Barney Carter's No. 1 T. O. Wright et al, 1,000 ft. from N line and 700 ft. from E line of survey, Juan Vargus Sur. ..... Drlg. 1,525 ft.
Long Drilling Co.'s No. 3 G. A. Turner, D. W. Campbell Sur. ..... Derrick.
Alex McCutchin's No. 3 Hathaway, 330 ft. from N line and 1,320 ft. from W line of survey, D. Shaw Sur.... Drlg. 3,150 ft.
Mundt et al's No. 1 O. G. Funderburg, 330 ft. from NW cor. of 63-ac. tract, Victory Loupy Sur. ..... Drlg. 5,002 ft.
Pine Grove Oil Co.'s No. 4 S. S. Cooke, 2,780 ft. from N line and 7,440 ft. from E line of survey, Juan Vargus Sur. ..... Derrick.
Sun Oil Co.'s No. 1 Mrs. E. Jarvis, 990 ft. from most westerly W line and 330 ft. N of interior cor. of 63-ac. tract, W. Smith Sur. ..... Drlg. 2,000 ft.
Texarana Oil Co.'s No. 2 S. S. Cook, 2,780 ft. from N line and 7,580 ft. from E line of survey, J. Vargus Sur. ..... Rig up.

TITUS COUNTY

Garland Hallett et al's No. 1 W. W. Jackson, 330 ft. from S and E lines of 20-ac. tract, J. E. Hopkins Sur. ..... Spudding; elevation 369 ft.

UPSHUR COUNTY

Perrin and Fell's No. 6 C. C. Landers, 370 ft. from N line and 3,700 ft. from W line of survey, G. W. Hooper Sur. ..... Rig up.
B. F. Phillips' No. 2 L. P. League, 490 ft. from N line and 1,000 ft. from W line of survey, H. F. Rodgers Sur. ..... Running csg.; top Austin chalk 3,559 ft.
Rosier and Pendleton's No. 2 E. C. Evers, 1,780 ft. from W line and 4,700 ft. from N line of survey, G. W. Hooper Sur. ..... Rig up.
Wadley and Lyons' No. 1 Mrs. Susie Smith, 330 ft. from NW cor. of Mrs. Susie Smith's 130-ac. tract, J. Halbert Sur. ..... Drlg. 3,330 ft.
Wadley & Lyons' No. 3 Shuttlesworth, 330 ft. from S line and 370 ft. from E line of lease, James M. Dunn Sur. ..... S.D. 1,500 ft.

VAN ZANDT COUNTY

C. P. Cole et al's No. 1 Mrs. S. Tunnell, 150 ft. from S and E lines of 66-ac. tract, M. Gross Sur. ..... S.D. 1,380 ft.
Gulf Oil Co.'s No. 1 Gillentine, 150 ft. from S and E lines of E 4 acres of 42-ac. tract in Nacogdoches County School Land Sur. ..... Small show oil 1,204-24 ft.
Isaac et al's No. 1 E. T. Rhodes, 150 ft. from S and E lines of 22-ac. tract, William Page Sur. ..... Derrick.
Petroleum Pipe Line Co.'s No. 3 Mrs. S. McGee, 650 ft. from S line and 150 ft. from W line of Blk. No. 17, William Daniels Sur. ..... Rig up.
Pure Oil Co.'s No. 7 C. L. Swain, 350 ft. S of N line and 250 ft. W of E line of O. L. Swain, S 40-ac. tract of E 70-ac. tract, John Walling Sur. ..... Drlg. 2,440 ft.
Ray Drilling Co.'s No. 1 J. W. Mallory, 1,150 ft. from S line and 150 ft. from W line of 217-ac. tract, John Walling Sur. ..... Derrick.
Rensonover et al's No. 1 D. T. Cole, 150 ft. from S and E lines of 45-ac. tract, Nacogdoches County School Land Sur. ..... Fishing for bailer 1,175 ft.
Van Oil Association's No. 1 Tankersley, 200 ft. from E and 1,000 ft. from S of farm, L. Landers Sur. ..... Drlg. 810 ft. in new hole.

Wildcat Operations in West Texas

(Continued from Page 30)

on 13th.
J. P. Williams et al's No. 1 Scott, 1,650 ft. from N and 330 ft. from W, Sec. 179, Blk. 1, T.&P. Sur. ..... T.D. 2,002 ft.; 600 ft. of salt water in 5 minutes.

RUNNELS COUNTY

Dutton et al's No. 1 Dean, 5,475 ft. from NE and 1,045 ft. from NW in J. Hall Sur. No. 519 ..... S.O. 3,417-30 ft. S.D. 3,499 ft.
John Castor's No. 1 Hall, 330 ft. from S and W, Sec. 149, E.T.R.R. Sur. ..... Spudded

SCHLEICHER COUNTY

Wesner et al's No. 1 Nicks, 2,310 ft. from N and 2,303 ft. from E of Sec. 77, Blk. LL, T.C. Sur. ..... Drlg. 6,370 ft.

UPTON COUNTY

Gulf Prod. Co.'s No. 103 McElroy, 1,980 ft. from S and 660 ft. from W, Sec. 197, Blk. F, C.C.S.D.&R.G.N.G.... Drlg. 3,898 ft.
George Bentley et al's No. 1 C. Bergman, 330 ft. from NE line and 2,310 ft. from NW lines of Sec. 36, Blk. 5, H.&T.C. Sur. ..... Fishing for tools; T.D. 2,647 ft.
George Bentley et al's No. 1 A. Emory, 1,330 ft. from NE line and 2,310 ft. from NW line of Sec. 36, Blk. 5, H.&T.C. Sur. ..... Drlg. 2,332 ft.
W. A. Black et al's No. 1 Ann B. Gordon, 990 ft. from NW and 330 ft. from NE lines of Sec. 6, Blk. 34, H.&T.C. Sur. ..... S.D. 2,394 ft.
Sppenauer Drlg. Co.'s No. 1 University, 380 ft. from N and 440 ft. from E of S half of Blk. 16 ..... Rig.
Gerber O. & G. Co.'s No. 1 Stubbs, 330 ft. from S, 990 ft. from W, Sec. 9, Blk. 3, B.&B. Sur. ..... Cellar.
Gulf Prod. Co.'s No. 16 Hutchings, 1,932 ft. from S and 1,650 ft. from W, Sec. 5, Blk. F ..... Swabbing and cleaning out; T.D. 2,754 ft.
Gulf Prod. Co.'s No. 17 Hutchings, 330 ft. from W line and 1,151 ft. from S line of Sec. 5, Blk. A, G.&M.M.B.&A. Sur. ..... Est. good for 300 bbls. of oil per day; T.D. 2,748 ft.
Gulf Prod. Co.'s No. 30 O'Brien, 990 ft. from S line and 660 ft. from W line of Sec. 6, Blk. F, G.&M.M.B.&A. Sur. ..... T.D. 2,950 ft.; plugged back to 2,684 ft.; swabbed 20 b'ls. oil and 15 bbls. of water in 3 hrs.
Humble Oil & Ref. Co.'s No. 1 Louis, Richter et al, 1,650 ft. from the NE line and 990 ft. from SE line of Sec. 27, H.&T.C. Sur., Blk. 34 ..... Flowing 1 bbl. of oil per day; T.D. 2,560 ft.
Skelly Oil Co.'s No. 2 Brillhart, 1,320 ft. from SE line of Sec. 13, Blk. 34, H.&T.C. Sur. ..... Flowed 18 bbls. per day; T.D. 2,513 ft.
Wahlenmaier Pet. Corp.'s No. 1 Bergman, 2,310 ft. from NE line and 1,650 ft. from SE line of Sec. 36, H.&T.C. Sur. ..... S.D. 2,185 ft.; est. 20 bbls. of oil per day.

WINKLER COUNTY

Colonial Oil Co.'s No. 2 State Scarborough, 990 ft. from W and 1023½ ft. N of the NE cor. of Sec. 1, School Blk. 77, located in Sec. 1, Blk. W.F. ..... Rig up.
Sid Richardson's No. 3 John Scally, 2,310 ft. from the N line and 330 ft. from the W line of Sec. 94, G.&M.M.B.&A. Sur. ..... Derrick.

Wildcat Operations in Texas Panhandle

Week Ending June 19

CARSON COUNTY

Company, well, farm name, section and block—	Remarks
The Texas Co.'s No. 2-B Garner, 990 ft. N and E, Sec. 95, Blk. 4, I.&G.N. Sur.	T.D. 3,040 ft; pumped 52 bbls. first 8 hrs.; pumping.

DEAF SMITH COUNTY

Western Union Oil Co.'s No. 1 Farwell, Sec. 18-3n-2e.... Drlg. 1,510 ft.

GRAY COUNTY

British American Oil Co.'s No. 2 Phillips, 330 ft. from S and W lines of W½ of E½ of Section 27, Block No. 3 I.&G.N. Survey ..... Derrick.
R. Dunlop's No. 1 Priest, 990 ft. S and 330 ft. W Sec. 14, Blk. S, J. C. Short Survey ..... Drlg. 2,225 ft.
Continental Oil Co.'s No. 4 Finley, Sec. 32, Blk. 2-B, H.&G.N. Sur. ..... O.W.D.D.; T.D. 2,957 ft.
Denworth Oil Co.'s No. 2-B Webb, 330 ft. from N and W lines, SE NW Sec. 61, Blk. 25, H.&G.N. Sur. .... Cellar.
Gulf Production Co.'s No. 3-A Catlin, 330 ft. from S and W lines of Gulf lease in NE of Section 57, Block 3 I.&G.N. Survey ..... Rig up standard tools 2,902 ft.
Hendron et al's No. 1 Hunseiby, 330 ft. S and E of SW SW Sec. 11, Blk. A-9, H.&G.N. Sur. ..... Rig.
Masda-Shell's No. 4 Coomba-Worley, 990 ft. from N line 330 ft. from E line, Sec. 35, Blk. 3, I.&G.N. Sur... Rig
Tedesco-Bell O. & G. Co.'s No. 4 Morse, 990 ft. N and W SE, Sec. 1, Blk. 24, H.&G.N. Sur. ..... S.D. 2,542 ft.
The Texas Co.'s No. 4 Brown, 330 ft. N, 990 ft. W of W½ Sec. 137, Blk. 3, I.&G.N. Sur. ..... Cementing parting csg.; T.D. 3,264 ft.
Warner Oil Co.'s No. 1 Webb, 660 ft. from S and W of W 80 of N½ Sec. 42, Blk. 25 ..... Drlg. 2,235 ft.

HUTCHINSON COUNTY

Badger Oil Co.'s No. 5 Lewis, 2,275 ft. from S, 330 ft. from W, Sec. 18, Blk. L, E.L.&R.R. Sur. ..... Drlg. 2,630 ft.
Dixon Creek Oil Co.'s No. 1 Haile, 660 ft. east of Alexander's No. 1 Cockrell, Sec. 4, Blk. M-21, T.C.R.R... Drlg. 1,580 ft.
E. W. Means et al's No. 1 Pond, 330 ft. S and E, N½ of E 165½ acres, Sec. 2, Blk. M-21, T.C.R.R. Sur. .. Drlg. 2,105 ft.
H. Stekol's No. 4 G. A. Whittenburg, 450 ft. from N line, 990 ft. from W line, Sec. 35, Blk. M-23, T.C. R.R. Sur. ..... Drlg. 850 ft.

RANDALL COUNTY

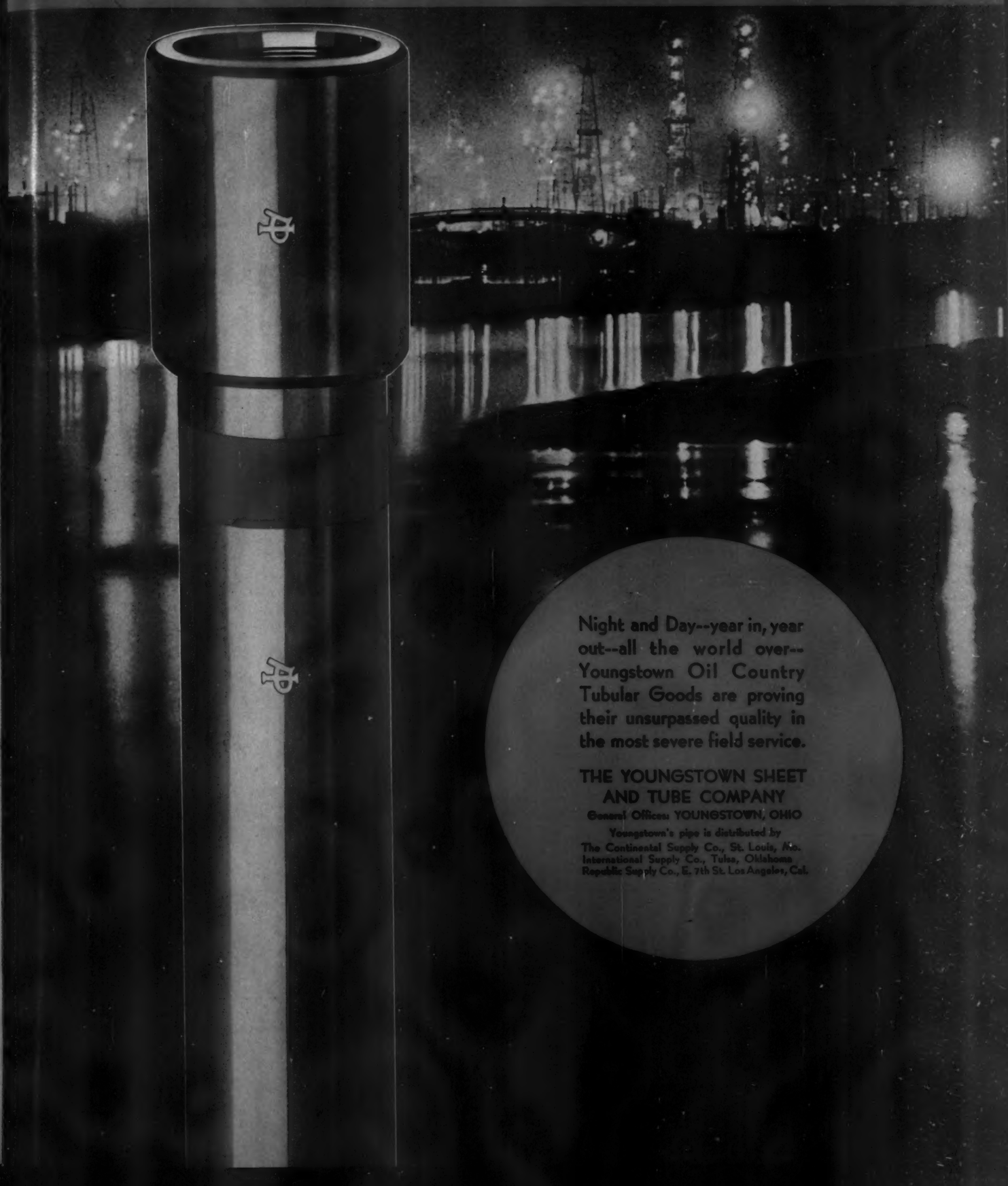
Woolsey & Devore's No. 1 Below, 330 ft. N and 1320 ft. E of NE, Sec. 85, Blk. 2, A.B.&M. Sur. ..... Drlg. 810 ft.

WHEELER COUNTY

Bell O. & G. Co.'s No. 1 Evans, 330 ft. N and E of NW Sec. 51, Blk. 24, H.&G.N. Sur. ..... Spraying 15 bbls. oil per day; T.D. 2,328 ft.
Martin & Dubose's No. 1 Grogan, C NE Sec. 57, Blk. 23, H.&G.N. Sur. ..... Rig up.
Rogers & Harper's No. 1 J. U. Clark, 990 ft. S and W of Sec. 4, Blk. 24, H.&G.N. Sur. ..... Rig.
The Texas Co.'s No. 3 Bentley, 330 ft. N and W of W½ of SW¼, Sec. 42, Blk. 24, H.&G.N. Survey.... Drlg. 1,705 ft.

YOUNGSTOWN

OIL COUNTRY TUBULAR GOODS



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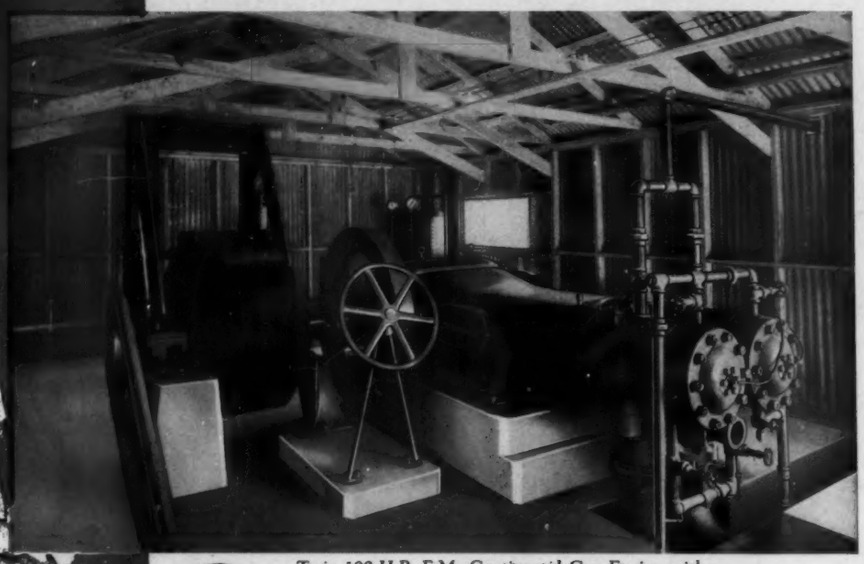

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Lifting Oil in East Texas

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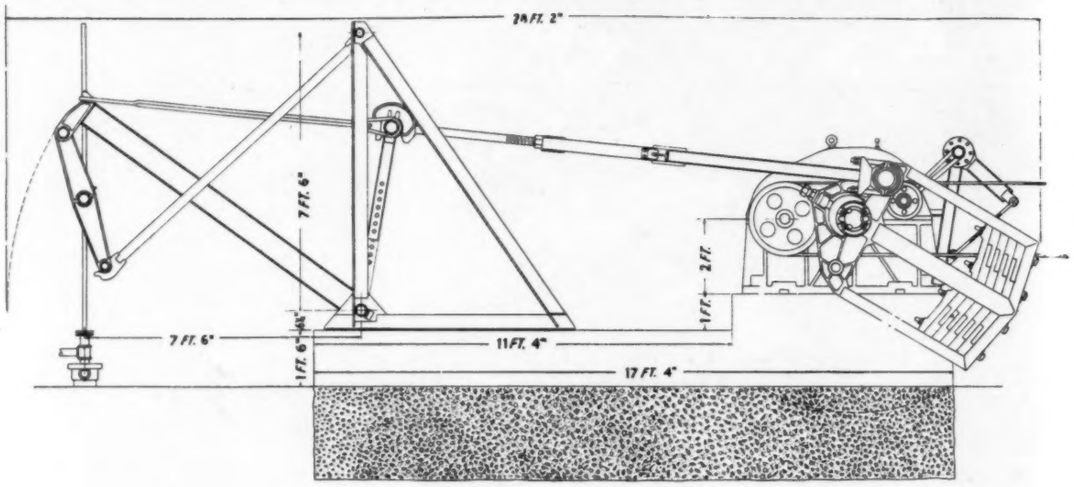
The FRICK-REID Master No. 1154 Pumping Unit and Master No. 54 Pumping Jack

THE Frick-Reid MASTER JACK gives a straight lift—will not drop rod load on stuffing box—Note positive bottom stop—has slow starting lift—will not wabble or crawl out of line—is easily moved out of way for pulling rods or tubing —is amply lubricated by large reservoirs with Alemite fittings —has an easy stroke adjustment—machined bearings bronze bushed—electric welded frame. Depth of well, maximum 6500 feet-2" tubing 60" stroke at 18 R. P. M. or equivalent. Weight 2300 lbs.



The Frick-Reid MASTER UNIT is equipped with FRICK-REID-Ottumwa speed reducer with single reduction herringbone type gears especially designed for oil well pumping service. Duty-30 H. P. at 20 R. P. M. on slow speed shaft—housing of semi-steel heavily ribbed and exceptionally rugged—"Perfect" oil seals around all shafts make them oil and dust tight —large inspection plate—Lubrication-continuous by splash and flood system—drive by four V-belts—Prime Mover-any 15, 20 or 25 H.P. single cylinder gas engine equipped with sheave of suitable size and clutch. Weight 5000 lbs. A UNIT COMBINING SIMPLICITY-DEPENDABILITY-LOW INITIAL INVESTMENT AND ECONOMY OF OPERATION.

DREADNAUGHT PUMPING CROWN BLOCK TYPE "L"

Qualities essential for true economy in a pumping crown block. Frames of heavy I-beams—sheaves of semi-steel with A.P.I. standard grooves machined to perfect smoothness—Bearings of phospher bronze, fitted to taper seat of box, affording extra long bearing surface—Bearings easily removed or renewed. Adequate lubrication. Available in following sizes: 8"x5'6" to 7' beams with 20" sheaves; 10"x5'6" to 7' beams with 22" sheaves; 12"x7' beams with 26" sheaves.

A new DREADNAUGHT Type "C" Pumping Crown Block, constructed along the same general dimensions as the Type "L" but with babbitted bearings (bronze bearings at slight additional cost) and pipe spacers offers a thoroughly dependable block at a minimum cost. Available in sizes from 8"x7' or 7'6" beams with 20" sheaves; 10"x7' or 7'6" beams with 20" or 22" sheaves.

DREADNAUGHT SUPER-TYPE TUBING BLOCK

In which the proven advantages of TIMKEN BEARINGS—Dreadnaught alloy steel A.P.I. standard sheaves with high manganese content and grooves for wire lines machined to absolute smoothness—hubs drilled and machined to perfect concentricity with sheave grooves and with a reliable Alemite lubrication system—are embodied. Center pin is of special steel of great strength and is drilled to permit lubricant to reach each bearing. Extra heavy construction gives ample strength for any tubing block service. Offered in following sizes: 30" single or double, 16" sheaves; 36" single, double or triple, 20" sheaves; 42" single or double with 26" sheaves.

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24 foot wheel with 24 inch throw eccentric

REID TYPE "C" 2-CYCLE GAS ENGINES

The ultimate choice where dependable, reliable and economical performance is demanded. Size from 35-40-45 H. P. to 14½x18" and 15"x18" which latter sizes develop well over 100 H. P. at moderate speeds.

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RUBBER BELTING

Frick-Reid Pumping Belts are manufactured for this special type of service. Only the finest materials are used in their production and they exceed A.P.I. specifications. We can make very prompt shipments of endless belts to your order.

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The AXELSON GROOVE SEAL INSERT PUMP

Its chief advantage lies in the fact that it offers a larger inside diameter for the same size tubing than any other insert pump. The barrel portion consists of a steel tubing, while the plunger section is made up of cast iron liners. Each of these liners is grooved, the grooves being bevelled so that they approach the action of cups in their operation. Axelson Groove Seal Pumps are furnished in two standard lengths and four different sizes.

AXELSON On lease after lease in Eastern, Mid-Continent and Western Oil Fields, production has been increased and operating costs reduced through the installation of Axelson Pumping Equipment.

AXELSON A.P.I. STANDARD NO. 55 AND AXELSON A.P.I. AMCO NO. 60 SUCKER RODS

Pull Rods.
Pumps (Working Barrels) a type for every oil field condition.
Stuffing Boxes.

AXELSON STUFFING BOX

Note the design. Handles are integral. Upper end of cap is provided with a reservoir to allow lubrication of the packing around polish rod. Any type of suitable packing may be used. Glands or followers are used which take up all wear—the main body lasts indefinitely.

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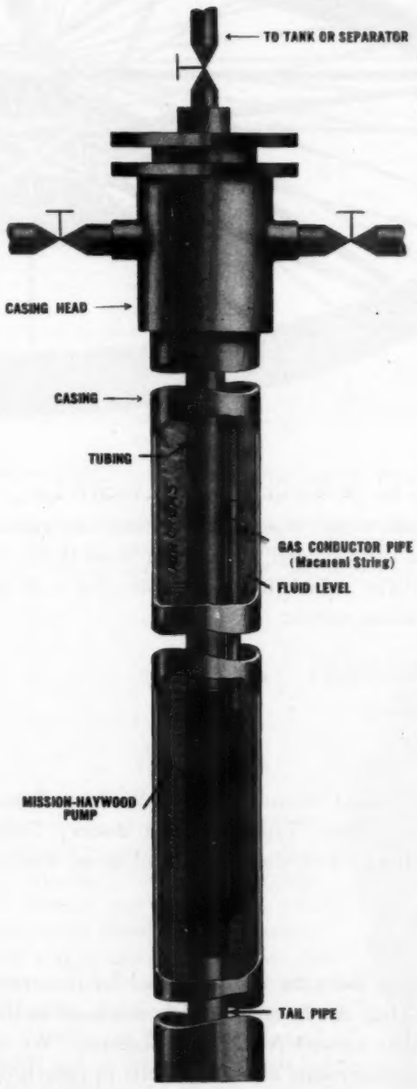

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East Texas Field Will Be the Proving Ground for Many Different Types of Equipment

By L. G. E. BIGNELL
Petroleum Engineering Editor

Data recently secured from wells in the East Texas Field indicate quite clearly that the remaining natural flowing life of a large proportion of the wells is very limited. In a general way it may be stated that wells in the Carlisle district at the south end of the field, wells in the north part of the Lathrop area and all along the western and eastern edges of the field must be prepared for mechanical production very soon. In fact, the rush is now on in those areas to equip the wells immediately for securing additional oil. Even wells in the "fairway," or the heart of the field, a comparatively narrow strip running through the middle part of the field from north to south, are showing signs of weakness and bottom hole pressures are dropping appreciably.

The operators all understand the need for preparing to get their allowable oil when natural flow ceases and those who have delayed in placing orders for their needed equipment are now rushing on the market and buying extensively so that the manufacturers are rapidly filling their shops with firm orders for large volumes of equipment. It is reported that many of these manufacturers already have enough business booked to insure them of steady plant operation for the balance of this year, and in many cases well into next year.

This condition has been expected to develop because when all the facts are considered East Texas is just another Woodbine sand field except with regard to its size. The field covers a large area and naturally has an enormous potential production. However, its daily allowable has not been based upon the daily demand or upon the natural capacity of the field to produce if the oil and gas is to be replaced by water drive at a rate that would have maintained bottom hole pressures throughout the field.

Having disregarded both man-made and natural laws, the excessive output of this field has hastened the day when installation of mechanical production equipment must be made. Instead of equipping the wells during the past two years, as they were completed, for mechanical production, most operators have put off the inevitable and now find themselves faced with the problem of securing some kind of machinery quickly. This great demand will throw heavy burdens upon the equipment manufacturers and supply companies, and to assist both buyer and seller The Oil and Gas Journal has prepared this special insert or guide for buyers and sellers.

Purpose of Buyer's Guide

The larger operating companies have long given consideration to the amount and type of equipment they would require to service their wells. While they have not all placed advanced orders for their needs they have definite plans perfected and have thus reduced their present labor to a minimum. Some companies have indicated to manufacturers well in advance of placing orders what kind of apparatus they would use and have thus permitted the material to be assembled ready for prompt shipment.

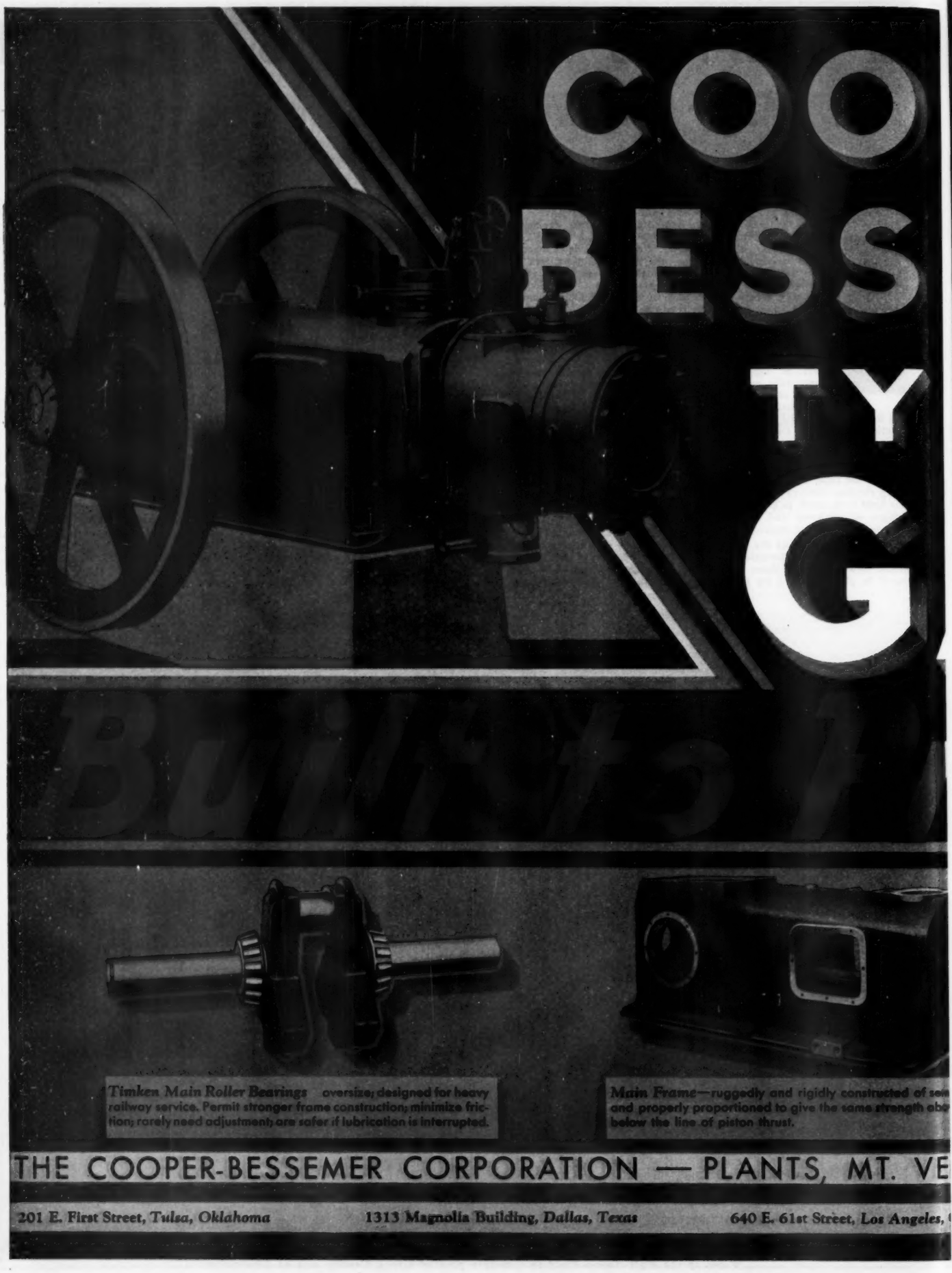
However, the great majority of the wells are still to be equipped and about 50 per cent of them are owned by the smaller operators who do not have engineering departments although they do have competent production men on the leases. The owners of many of these wells will be the buyers of the equipment and will have to act as both engineer and purchaser and probably will follow up the order into the field to see that it is properly installed.

To assist this latter group in particular, but also to place in a convenient volume the available data upon mechanical production equipment suitable for East Texas wells in the hands of all interested parties, this Buyer's Guide has been prepared. It is realized that all possible combinations of machinery will be assembled for producing these wells. These variations are almost unending, but in preparing this guide it is hoped that all of the principal production methods have been covered in such a manner as to indicate clearly what can be used to secure the oil when natural flow ceases.

Production Conditions

As the wells grow older the reservoir or bottom hole pressure declines. In East Texas this decline has been at the rate of about .7 pound per 1,000,000 bbls. of oil produced up to April 24 when the field was opened up to a flowing rate of over 1,000,000 bbls. daily, and the drop in pressure since then has been at the rate of 4.85 pounds per million barrels between April 24 and May 8, and at the

View of the East Texas Field in Southern part of Gregg County east of Gladewater



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A

Roller Bearings were not an experiment for Cooper-Bessemer when the Type GA Engine was designed. Over a period of seven years they have been used exclusively in six different Cooper-Bessemer Types, the largest 400 H. P., without a single failure. Die-forged crank shafts had also proven to have much greater fatigue resistance under laboratory test and had demonstrated their advantages during several years of actual service. Consequently the Type GA was designed to take full advantage of these two features. Notice particularly the strength of the main frame section over the main bearings. For long life, for low maintenance cost, for ease of starting, there never has been an oil field engine which can be fairly compared to the Type GA.

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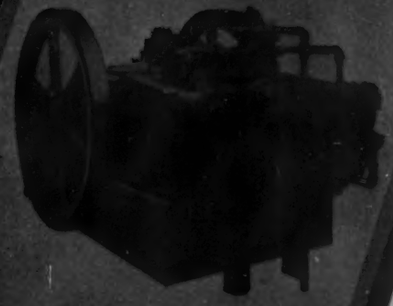
Die forged Crankshaft—cross section shows how die forging preserves continuous flow lines of high-grade, heat-treated steel. Extra large in diameter, non-failing.



Type GAU—pumping and drilling engine, rated 65 to 130 B. H. P. depending on speed. Like Type GA, it attains 4 cycle economy when equipped with gas injection pump. Convertible for gas or oil.

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rate of about 3 pounds per million barrels between May 8 and June 8.

This rapid dissipation of reservoir energy has reduced the remaining flowing life of the wells very materially and hastened the day of mechanical production. However, even under these adverse conditions of rapid production the wells are acting quite normally in that there is a period of change between natural and mechanical production when the wells will flow if they are "kicked off."

The average depth of East Texas wells is about 3,650 feet. The column of mixed oil and gas has a gravity of 0.761, so the pressure exerted at the bottom of the well will be 1,194.77 pounds per square inch. Therefore any bottom hole pressure above 1,200 pounds would sustain a column of oil and gas more than 3,650 feet high. Many of the wells are deeper than 3,650 feet and therefore require more than 1,200 pounds bottom hole pressure to balance column weight.

This same height of column composed of East Texas oil only, which has a gravity of 0.829, would exert a bottom hole pressure of 1,301.12 pounds per square inch after the gas had escaped from it. So it would be necessary to have over 1,300 pounds bottom hole pressure to balance a column of East Texas gas-free oil.

It has been found that many wells go dead when they have been shut in for a short period after flowing their allowable. The oil at the bottom of the well has a temperature of about 143° F., but a top-hole temperature of about 90° F. When the well is allowed to stand full of oil the temperature in the well shrinks and with the gas liberated the oil will occupy about 30 per cent less space than the gas-oil mixture.

Pumpers Classified

Such a shrinkage lowers the oil level in the well so that it is found to be 150 to several hundred feet below the top of the well after a shut-in period. The only way to start a well of this type is to agitate it by some mechanical method and even after such treatment many of the wells will not respond after a while. "Dead wells" may be classified as those wells which will not resume natural flow after a period of shut-in production. If they must be agitated to bring them back onto production they should be classified as pumpers.

Wells that have such a low bottom hole pressure that they will not flow unless agitated may be kept on natural flow a longer time by the use of bottom hole chokes. These chokes are lowered inside the tubing and reduce the pressure on the top side of the choke low enough to permit the gas to come out of solution and in so doing the oil is converted into a mist and carried to the surface along with the escaping gas.

Bottom hole valves have also tended to prolong the natural flowing life of some East Texas wells. Tapered tubing has also been run in many wells in the East Texas Field and has prolonged flowing life. They act much the same as bottom hole chokes and if properly designed and installed can be used efficiently.

Flow String Design Important

The selection of the proper size flow string is quite essential for any well and it is now known that improper size tubing has been the cause of many wells in East Texas ceasing to flow at bottom hole pressures still high enough to cause other wells with proper size tubing to continue natural production.

There are several methods of prolonging natural flowing conditions in East Texas wells, but sooner or later some mechanical production system must be installed. Even though repressuring by water will eventually take place in all of this area it is now feared that this water drive has been uncontrolled and consequently the water is fingering through the sand.

The original underground conditions in the producing formation of the East Texas Field were almost ideal to have permitted almost complete recovery of the oil by the action of a water drive from the west. This water existed there when the field was discovered at a static pressure of about 1,650 pounds per square inch and at a temperature of 143° F. The pressure is hydrostatic and if the rate of withdrawal of the oil and gas had been so regulated as to equal the rate of water movement into the sands the oil would have been washed out and into the wells with a resulting high percentage of recovery.

This withdrawal rate not having been controlled or limited to the rate of water movement, and during the past six or seven weeks having been at the rate of over 1,000,000 bbls. of oil per day, the result has been to release the water to uncontrolled movement through the producing formation and it is now anticipated that much oil will be trapped underground and future recovery will be difficult, if not impossible.

Early Equipping Necessary

To prevent additional underground waste it is quite necessary that the wells be equipped for mechanical production early so that there need be no delay in changing over from natural to mechanical conditions. Delay in placing such equipment may result in serious damage to the well because water may move into the sand surrounding it and drown the oil out because there has been a period during which the well would not flow naturally and no means are at hand to get fluid out of it by mechanical means.

All Kinds of Equipment Used

There are numerous types of production equipment available for producing East Texas wells and it is predicted that it will be one of the greatest proving grounds for equipment ever opened in this country.

Beam pumping, central powers, submerged pumps of numerous kinds, gas lifts, intermittent flowing devices, in fact many types of rod and rodless pieces of equipment will be used. These units will be driven by prime movers of all kinds also, steam, internal combustion engines of oil, gas and gasoline types, and electric motors.

It is generally conceded that at least 40-horsepower units are best adapted to both pumping and cleanout requirements. The actual power necessary to pump the wells will vary from 5 to 20 horsepower depending upon the quantity of fluid handled.

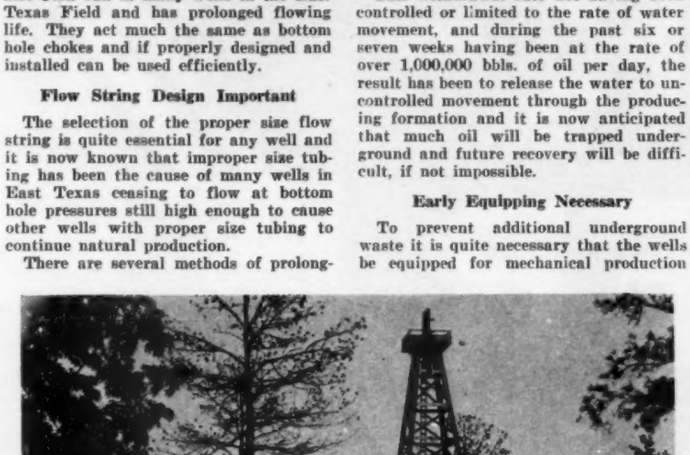
In a series of special articles in this section the various production methods are discussed. It is hoped they give sufficient information to be of assistance to prospective buyers to help them in selecting equipment best suited to their particular requirements.

Based upon past experience with Woodbine production in other fields, it is anticipated that trouble will be experienced with floating sand and corrosion of balls and seats from salt water. When the oil has been driven out of the Woodbine sand and salt water replaces it, the cementing material in this sand is dissolved and the sand grains are washed into the well.

In a formation having stratigraphy similar to East Texas, where there are alternate layers of sands and impervious materials, it has been found that the sand will wash out to the extent that the overlaying impervious stratum is unsupported and it will sluff into the hole and sometime shut off the face of the producing sand. Many wells in East Texas have also shown strata of ash or bentonite and some anhydrite. This material is also mixed in the sand itself and has reduced the porosity very materially in some wells.

There are numerous methods of cleaning wells that have sand troubles and no serious troubles should be experienced because of these conditions. The experienced operators have had ample opportunity in the past to work out suitable production practices to keep wells of this type with only a minimum of shutdown time. Equipment described in this guide will assist other operators in solving their problems if they will only profit by the advice and suggestions given.

In selecting any equipment or material for the East Texas Field it is suggested that only the best be used because it is anticipated that these wells have long pumping life. Well selected and installed machinery should last the life of the wells, and when the daily production has fallen to a low level good equipment will still continue to operate with low repair costs. This is very essential, for it is necessary to keep old wells pumping steadily if a profit is to be made.



Typical scene in area west of discovery well in Joiner district, East Texas Field

Typical Scene in the East Texas Field Showing Well Fully Equipped for Pumping

Electric driven counterbalanced all-steel pumping rig with back-side take-off to second well on same property

Central Powers, Pumping Units and Steel Fronts Will Be Extensively Used in East Texas

The question that is now being asked in the East Texas Field is, "What is the best method of securing the oil after natural flow ceases?" It has been predicted that this area will be the great proving grounds for every kind of equipment that has ever been used to secure oil by mechanical means. Already numerous new devices have been tried out and many more will be introduced as the field grows older.

There are two simple types of equipment that will be used extensively: Central powers with rods and jacks, and beam pumping outfits set at the well. Of the latter type there will be two classes, one consisting of bandwheel driven outfits and the other self-contained units. For any of these outfits all types of prime movers will be used including steam engines, internal combustion engines, and electric motors.

Many operators will use the type of apparatus that is easiest available. Old steam plants will be installed and either oil or gas used for fuel. While such outfits will not be economical of operation the first cost will be the determining feature in making the installation. It is anticipated, however, that such installations will be replaced later by more efficient units because pumping costs will be high and it will be found that it will be cheaper in the long run to discard inefficient equipment.

On many leases it will be possible to install central powers to good advantage. The topography of the country is such that these units will not be applicable to all leases because of the difficulty in running rod lines in a satisfactory manner. There are a great many trees in the area covered by the East Texas oil field. While these trees and underbrush can be cleared away there are other problems of ground contour that will not be so easy to overcome. While it is therefore anticipated that there will be only a limited use of central powers, still out of the total of over 10,000 wells the volume of business in this type of equipment will be very satisfactory to the manufacturers.

Beam Pumping Units

Where the beam type of pumping unit is used the back side cranks will also be installed and one or two additional wells pumped by the same power unit operating the walking beam. This is possible because the engine used will be of about 40 horsepower capacity and with a well designed and installed back side pumping unit it will be possible to pump at least three wells at one time with such a power unit. This will also be true if a 40 horsepower electric motor is installed.

Many improvements or refinements are noticeable in the types of rigs which are being used in this area. Attention is being given to beam design which permits of convenient and reliable lubrication at the pitman bearings, saddle bearings and rod hanger. Essentially straight lift motion is secured for the polish rod on long stroke rigs in various practical ways. Noise is being eliminated, friction reduced and appearances improved.

The increased use of alloy steels and more precise workmanship is noticeable. Counterbalances are almost universally a part of the equipment offered. Steel equipment will probably be extensively used for tubing boards and rod boards on the pumping well derricks. Steel derricks are replacing the old wooden structures used in drilling and they are being set upon well designed concrete foundations and concrete floors in the derrick, thus reducing fire hazard to a minimum.

The fluid level in most wells in this field will be quite high during the early pumping life of the wells. At the present time many wells that have to be agitated to start them producing have fluid levels within 150 feet of the surface. Others have fluid levels 1,000 feet below the surface and this seems about the lowest level encountered up to this time.

With this high fluid level it will not take a great amount of power to produce the oil and with a properly balanced back side pumping unit it will be a simple matter to operate at least three wells for some time to come from one power unit. As water makes its appearance and the load to be lifted is greater it may be that the load upon the power unit will reach the maximum capacity of the engine, but these prime movers can stand some overloading.

The advent of water into the wells will present a serious problem to the operators in disposing of it. If produced in large quantities it is going to present a very difficult problem for it cannot be dumped into the Sabine River or its tributaries, or back into other underground formations. Surface reservoirs will quickly fill because precipitation will be greater than evaporation. Just how it will be handled is not known at this time. A large conduit of redwood, cement or cast iron has been considered. Such a project would require the investment of from $18,000,000 to $30,000,000 for a line 210 miles long to dispose of this salt water in the Gulf of Mexico.

It therefore appears at the present moment that the pumping problems of East Texas will resolve themselves into suitable equipment to handle a rather limited amount of fluid daily, from wells with comparatively high fluid levels and pumping a comparatively small amount of oil daily.

In addition to the use of central powers and beam pumping units with back side jacks, many wells will be pumped by separate units of various types.

As an example some operators have already set internal combustion engines at a point about midway between two wells and through a reduction gear unit are driving pull rods from a back side crank. As these two wells are opposed the loads are practically balanced. Jacks are set at each well. It is reported that another operator has rigged up to pump two wells on each side of his power unit by this same general method and the outfit is working all right now. However, it is not anticipated that such layouts will continue for long to satisfactorily produce four wells because the loads will later become too heavy for the 25 horsepower engine to handle.

One well in the extreme southeast portion of the field is now operating quite satisfactorily with a 10 horsepower gas engine driving a beam pumping unit. This well is making about 33⅓ per cent water but the fluid level is high and it does not take much power to bring the fluid to the surface.

Submerged pumping units of several types have been tried out with varying degrees of success in East Texas wells. Electric motor unit with reciprocating pump has been placed in one well and is reported as working satisfactorily. Another type of submerged unit that has been used is operated by heated oil pumped down through macaroni tubing 1 inch in diameter to actuate a displacement pump at the bottom of a string of 3-inch tubing. On the first installation some trouble was experienced with paraffin but this has been overcome and the latest report is that it is now working all right.

Tapered strings of tubing have been tried in some wells to prolong flowing life. Bottom hole chokes have been used for the same purpose and both are reported as satisfactory in some instances. How much longer the use of such methods will continue the natural flowing life of the well is difficult to predict because the amount of gas available in the formation with the oil is limited to about 350 cubic feet per barrel of oil. The gas comes out of solution at 755 pounds pressure and when that limit has been reached in the well it is probable that much of the gas will escape ahead of the oil and the oil left behind will be more difficult to recover.

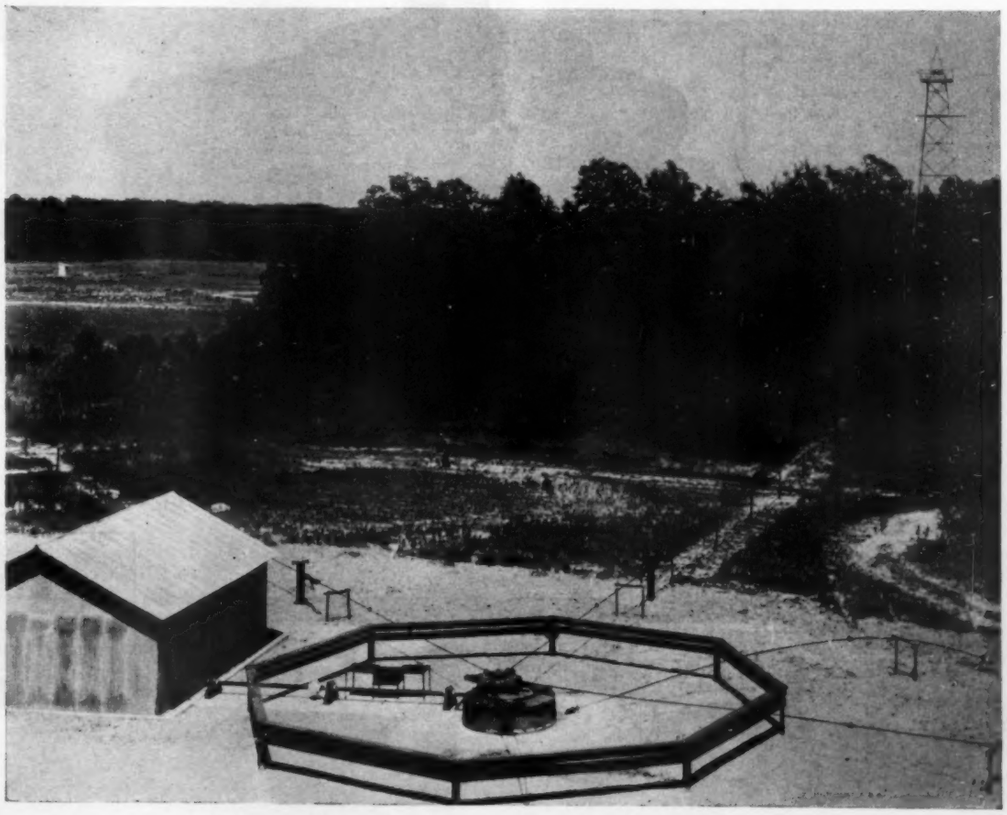
Transition Stage

The East Texas Field is now passing through the transition stage between natural flowing wells and mechanical production. All over the field wells have to be started again after they have been shut in following a production period during which they secured their daily allowable. When such wells are shut in the gas comes out of solution in the oil and the resulting fluid column sets up greater than flowing pressure at the bottom of the hole against the formation so the well will not again flow until it has been agitated in some way.

Where pumping equipment is over the hole and rods and working barrel in place it is sometimes sufficient to simply agitate the fluid for a short time when natural flow starts. However, it is usual practice to keep the rods in motion after the well starts flowing again but little power is required to operate the beam.

Other wells without mechanical equip-

(Continued on Page 80-D)

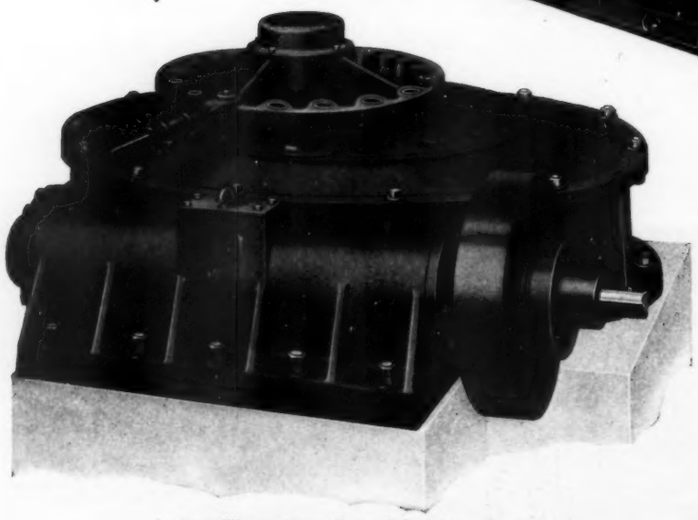


View of one of the powers now in use in the East Texas Field

UNITS WITH A BACK-

LUFKIN Central Powers

Lufkin Herringbone Central Pumping Powers



Lufkin Worm Gear Central Pumping Powers

POWERS IN FOUR SIZES

Worm Gear
Herringbone Gear

BONE AND A BACKGROUND

LUFKIN Geared Units

Lufkin Sykes-Herringbone Units are made in sizes to suit all field and operating conditions

Lufkin Twin Crank Herringbone Unit Assembly

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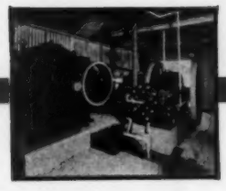


Steel Front Walking Beam and Self Contained Pumping Units Find Favor in East Texas

The walking beam rig consists of wood or steel beam mounted upon center irons that are carried upon a vertical sampson post. For East Texas this equipment will be most suitable if made from steel throughout. The length of the walking beam is about 24 feet and the sampson post is 16 feet high.

Motion is imparted to this walking beam through a pitman attached to the opposite end from the well and this pitman is in turn driven by a crank mounted upon the end of the band wheel shaft. The size of this shaft designates the size of the unit and these shafts may be 4½, 5 or 6-inch diameter. The larger size is recommended for East Texas and A.P.I. standards for shaft boxes and other accessories should be followed.

The band wheel that will be suitable for this duty is 12 feet in diameter with a 16-inch face. It is made of steel throughout and power is applied to it by a belt running back to the prime mover. For a gas or oil engine or electric motor it is usual practice to set a countershaft and reversing mechanism between the power unit and the band wheel. This permits speed reduction and reversal of motion with the engine running in one direction at all times.

The engine and band wheel with the belt is usually housed in a sheet steel building with the jack posts, walking beam and sampson post in the clear. A walk runs from derrick floor to engine house along one side of the belt house.

Speed Reduction Units

Where it is advisable to install individual prime movers at each well and the conventioial type of flat belt and band wheel drive is undesirable, speed reduction machinery can be installed.

This equipment is of two general types, one of which uses roller chain and sprockets and the other using one or more gear trains in the speed reducer. A great range of size and capacity rating are obtained using units of this character, which have now been standardized as to design, interchangeable parts or rating.

Because of the unique adaptability of these speed reduction units to any class or kind of prime mover, they enjoy a merited popularity. Since they must be accurately constructed and assembled, they give low maintenance and depreciation expenses.

General Design

One chain-driven type uses either a 94 or 106 double tooth gray iron split sprocket, keyed to a 6-inch shaft which is supported in roller thrust bearings. These bearings are mounted on adjustable pillow blocks, set on steel jack posts or a fabricated frame.

Drive to this sprocket band wheel is by a 2-inch pitch double roller chain. The driving sprocket is keyed to a countershaft, also mounted on roller thrust bearings. Provision is made for an adjustment between these shafts to compensate for chain wear. The driving sprocket has from 15 to 31 teeth, in odd numbers except the 23 and 25-tooth sprockets are combined in one 24-tooth size. This gives a reduction ratio of from 3.08 to 7.06 in this slow speed final reduction.

The countershaft is driven in various ways, and many ingenious adaptations are made to suit various conditions of prime movers and power application. The countershaft may be mounted as a unit with the crankshaft or mounted as a separate unit. On it may be mounted reversing equipment, two-speed clutches, solid pulley, "V" belt, flat belt or chain drives, takeoffs from one or more motors working in unison, takeoff to hoisting machinery, balance flywheels and braking machinery.

This machnery is of equal strength to the 6-inch standard rig and is classified as heavy duty, although on the same properties, on like equipment, motors varying in size from 7.5 horsepower to 150 horsepower have been used.

Geared Units

Gear train speed reducers have been operated successfully in almost every field developed during the last 20 years. The reliability of well designed and built gear units is shown by their repeated use in foreign fields, together with their wide distribution in isolated locations.

This type of equipment was developed for use with high speed, industrial type, multicylinder engines and electric motors. Recent adaptions of this equipment to the slow speed oil field type gas engines have been made.

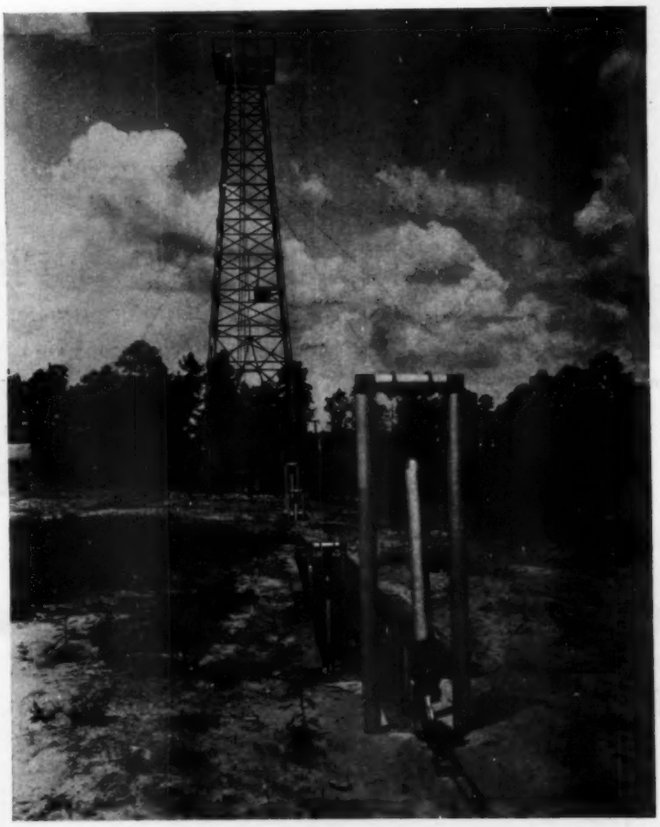
Pinions to drive the intermediate gears are cut on the primary drive shaft. The ends of this shaft extend outside the housing. This housing is of cast iron ribbed for strength. Because of the layout of the gear train, the bearing space was easily increased as the pressure increased. Since the housing completely encloses the gear train and bearing, flood type of lubrication is used.

Mounted on the primary shaft extension is a brake and the driven pulley. This driven pulley is preferably of the "V" belt type, since it can be adapted to various prime movers and allows of easier changes.

Well designed reduction gear trains of adequate capacity should give long life together with low upkeep cost and should have very good salvage value.

Specifications for Steel Fronts for East Texas

Material—	Weight (lbs.)
24-ft. 100-lb. I-beam type steel walking beam	2,650
Saddle bearing with cap plate and saddle	843
16-ft. steel sampson post complete with bolts	2,315
Set (2) 5-ft. jack posts complete with anchor bolts	1,720
Set of bridle irons consisting of 4 turnbuckle braces, U bolts, C links, 5-ft. 7-in. hold down rods, anchor bolts with 1 hex nut and malleable sleeve couplings	425
6-in. front jack post chain oiling bearing	425
6-in. back jack post chain oiling bearing	410
12-ft. by 16-in. steel face, two-piece, steel bandwheel less tug rim, and 7-ft. double tug pulley for bandwheel	3,265
Steel pitman less stirrup	413
Pitman stirrup with bolts	302
Swivel bearing	185
Rod hanger complete	235
Rigid bearing	119
Steel headache post complete with anchor bolts	497
Rotary type counterbalance complete with 6-in. by 8-ft. shaft and crank	2,513
3½-in. A.P.I. wrist pin	77
Split hub pumping crank, 6-in. 2 hole	330
Key	2
2¾-in. A.P.I. wrist pin	45
Total shipping weight, approximately	16,771



A type of power used in East Texas. Installation connected to three wells

Gear Unit Design

The description of one typical gear reduction unit used in East Texas follows:

The crank is keyed to the slow-speed chrome-nickel shaft, which is mounted between sleeve-type bearings. Occupying nearly the entire space between these bearings is a low-speed gear with continuous herringbone cut teeth.

The intermediate shaft is also mounted on sleeve bearing with a driving pinion, facing the slow-speed gear and between two spiral-cut gears which are adjacent to the bearings.

Speed reduction ratios. A motor could be connected to this shaft by a flexible coupling but actual oil field experience indicates a preference for the "V" belt type of primary drive.

The majority of the speed reduction units are equipped with crankshaft counterbalances. This assists in the smooth operation which distinguishes this type of machinery.

Back Side Pumping

If the pumping unit is powered with a 40 horsepower unit it is common practice to place a back-side crank upon the band wheel shaft and pump two or more additional wells. The power delivered through this crank and shaft is transmitted to rod lines through various types of rod jacks and swings.

The direction of the rod lines is usually straight because the three wells are in a line but if one or both wells pumped by the rod lines are located at any angle with regard to the powered well swings are used to change the rod line direction.

These swings, hold-ups, hold-downs, pendulums, throw-offs, links and other accessories for rod line pumping cover a wide variety of designs. Many are built to meet some special condition or suit the topography of the field. This is not unusual practice but it is noticeable in East Texas because the accumulated knowledge of past experiences in all fields seems to have been put to use in this new field and many strange and wonderful devices have resulted.

Manufacturers of this type of equipment are prepared to meet any condition of this kind that may arise and can usually do so with standard equipment. Rod jacks and swings to deliver the power from the back side to the rod lines have also taken many different forms and some of these pieces of equipment have included details developed in other fields and applied to East Texas pumping problems.

Briefly, no operator in East Texas need get along with any makeshift outfit if he cares to submit his problems to manufacturers of this type of equipment. In the long run it will probably be cheaper to follow this practice rather than make home-made devices which may not be properly proportioned and either prove too light for the duties imposed upon them, or so heavy and cumbersome that additional power is needed to keep them in operation. A saving of even a small

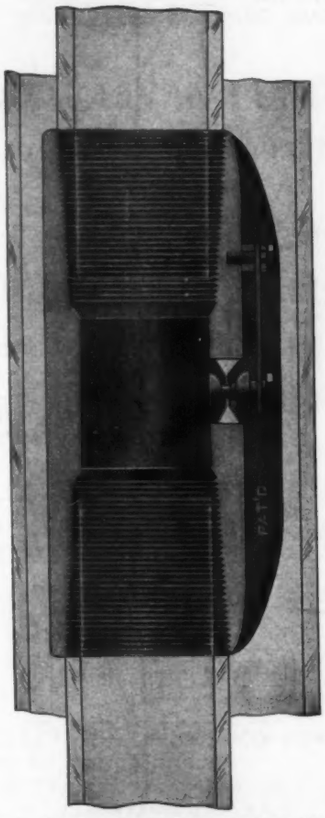
INSTANT KICK-OFF

POSITIVE CONTROL
WITH P & T KICK-OFF UNITS

INTERNAL TYPE

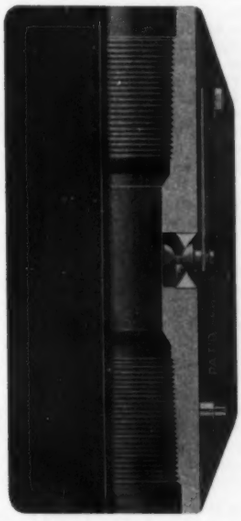
The internal type of unit is designed and recommended for small wells, that do not have enough natural gas pressure to flow them through the annular space. These units will control and lengthen the life of the well and allow it to be produced with natural gas. This unit is recommended for economical operation of small wells, where a quick kick-off is desired.

STANDARD TWO-WAY



This is the type P & T KICK-OFF UNIT as originally developed, which permits the well to be kicked-off either through the tubing or casing. The use of this unit in new wells eliminates the necessity of swabbing or bailing to displace rotary mud, water or oil to get a well to flow. The P & T KICK-OFF UNIT will clean the well in two and a half to three hours after the pressure is applied and will permit it to be produced with natural pressure. P & T KICK-OFF UNITS will start any well regardless of static level or viscosity of fluid.

EXTERNAL TYPE



This type will unload the well between the casing and tubing, with an average kick-off time of ten minutes. It is recommended for use when taking potentials. This type will also permit a well to flow through the tubing in the same manner as the Standard Two-Way. It is especially desirable for use in wells that have a very low working pressure, due to the fact that no pressure is required to keep the valve closed when flowing through the tubing.

P & T KICK-OFF UNITS will conserve gas pressure in fields where a limited supply of natural gas is available. Their use eliminates the necessity of high stage compressors and other equipment. Any well may be kicked-off with a low pressure regardless of the amount of drilling mud, water or oil in the hole. All UNITS are made to fit any standard A.P.I. tubing, size 2″, 2½″ or 3″. To take bottom hole pressure you do not have to pull tubing as all units have the same I. D. as tubing.

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2506 Wabash Ave.,
Fort Worth, Texas

Price - Trawick Inc.

STROUD OKLAHOMA

Oklahoma City, Okla.
Warehouse and Office:
1111 S. E. 29th. Street

amount of power per day if extended over the life of an East Texas pumping well will mean a lot of money in the operator's pocket eventually.

Individual Units

There is another type of walking beam unit that is finding much favor in East Texas. It is the individual self-contained pumping power consisting of the walking beam mounted upon a sampson post and the whole assembly mounted upon one common base. Such units are usually driven by electric motors and the power transmitted from the motor to the beam by reduction gears or by the use of "V" belts.

Many very satisfactory pumping units of this general type have been designed for East Texas requirements. They usually include a properly designed counterweight that is mounted on the crank and in this way the size of the motor is held to a minimum.

These units are mounted upon concrete foundations and require no housing over them. The motor and transmission equipment is housed and protected from the weather and bearings are usually enclosed to keep out dirt and rain.

With all pumping units it is quite essential that thought be given to protecting moving parts from undue wear from sand and dirt. The surface of the East Texas Field is largely sandy and when the wind blows this sand will get into any open parts around the rig. Many designers have had this particular problem in mind and have used tight bearings that are packed with grease at most points in the equipment.

The majority of the wells in the field will be pumped by sucker rods and the pumping units largely divided between central pumping power plants, walking beam rigs and individual power pumping units. All have their advantages and the other units that will be used for producing these wells will also be selected to meet some particular conditions at the wells where installed.

Walking Beam Pumping

The evolution of walking beam pumping has been quite natural from drilling outfits used in completing cable tool wells. After a well is completed with cable tools it is common practice to leave the derrick and other equipment at the hole and when the well goes off of natural flow to hook the sucker rods to the walking beam and pump it.

In East Texas most wells have been drilled with rotary outfits so no walking beams and their accompanying equipment are available when the wells are finished. It will, therefore, be necessary to install this type of equipment later if it is decided that it suits the individual well's requirements best.

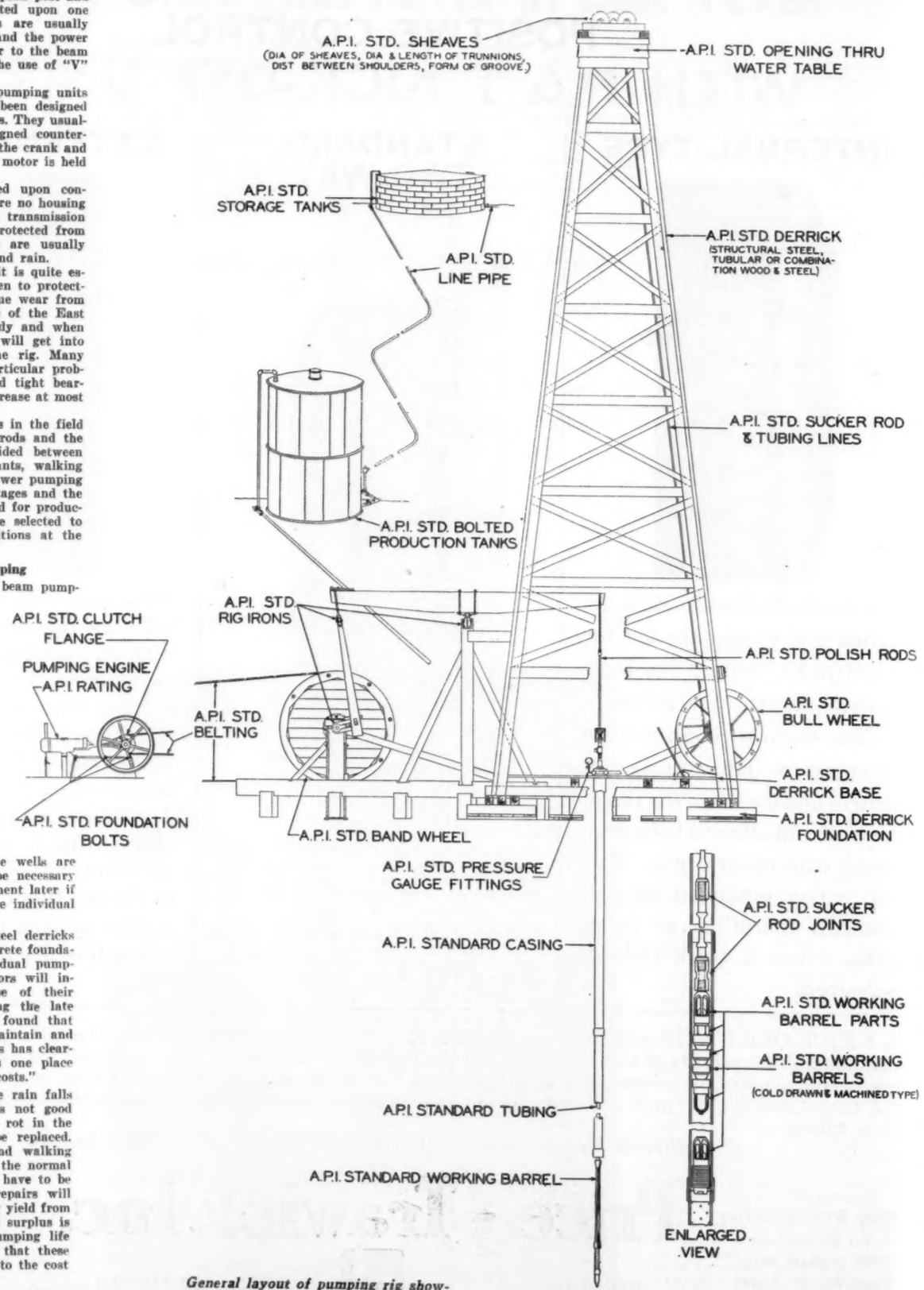
The steel "fronts" with steel derricks should be mounted upon concrete foundations for East Texas individual pumping conditions. Many operators will install wooden outfits because of their lower first costs, but during the late life of the wells it will be found that such outfits are costly to maintain and past experience in other fields has clearly demonstrated that this is one place where "first costs are best costs."

In East Texas considerable rain falls during the year. Drainage is not good and wooden foundations will rot in the ground and later have to be replaced. Jack posts, samson posts and walking beams of wood will not last the normal life of the well and will also have to be repaired or replaced. Such repairs will come at a time when the daily yield from the wells is low and unless a surplus is built up during the early pumping life of the well it will be found that these late costs will add materially to the cost of recovering the oil.

Any type of pumping equipment that is to be installed at a well in the East Texas Field should be selected for longevity because the recovery of the oil during the late life of the well will be the most costly. Steel is therefore recommended for all parts around the well and all equipment should be mounted upon concrete foundations. These installations should be carefully made and the recommendations of experienced engineers should be followed closely. It will also pay to have the installations made by experienced construction engineers. Savings in first costs may later result in inefficient operation and ultimately cost more than the additional cost of proper installations made in the first place.

The pumping duty of East Texas wells will vary through a wide range of conditions. At first many of the wells will flow if they are agitated by rods and working barrel. Later they will have only a light pumping load because the oil column will be lightened by gas in solution. When the water reaches the well and it must be pumped along with the oil the duty on the pumping equipment will be most severe and this duty will

(Continued on Page 80-D)


A.P.I. STD. SHEAVES
(DIA OF SHEAVES, DIA & LENGTH OF TRUNNIONS, DIST BETWEEN SHOULDERS, FORM OF GROOVE)
A.P.I. STD. OPENING THRU WATER TABLE
A.P.I. STD. STORAGE TANKS
A.P.I. STD. LINE PIPE
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A.P.I. STD. SUCKER ROD & TUBING LINES
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A.P.I. STD. RIG IRONS
A.P.I. STD. CLUTCH FLANGE
PUMPING ENGINE A.P.I. RATING
A.P.I. STD. BELTING
A.P.I. STD. FOUNDATION BOLTS
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A.P.I. STD. DERRICK BASE
A.P.I. STD. DERRICK FOUNDATION
A.P.I. STD. BAND WHEEL
A.P.I. STD. PRESSURE GAUGE FITTINGS
A.P.I. STD. SUCKER ROD JOINTS
A.P.I. STANDARD CASING
A.P.I. STD. WORKING BARREL PARTS
A.P.I. STD. WORKING BARRELS (COLD DRAWN & MACHINED TYPE)
A.P.I. STANDARD TUBING
A.P.I. STANDARD WORKING BARREL
ENLARGED VIEW
PUMPING OUTFIT

General layout of pumping rig showing A.P.I. standardized equipment

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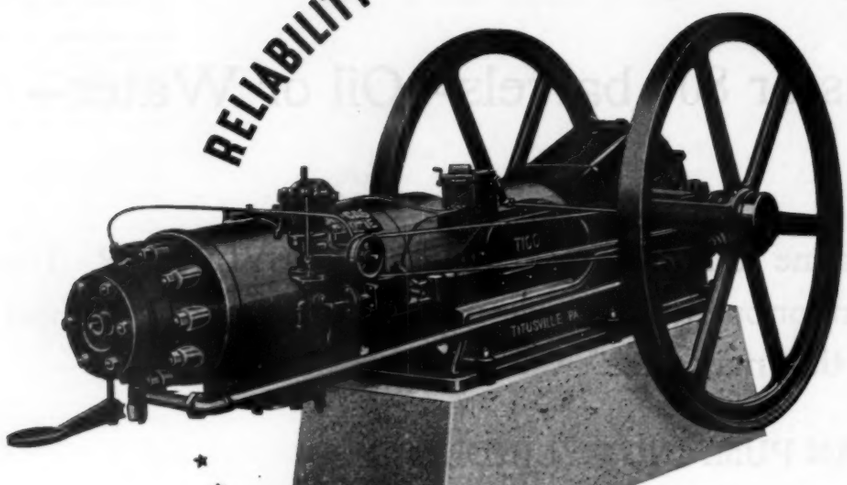
RELIABILITY

ACCESSIBILITY

ECONOMY

FLEXIBILITY



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Sucker and Pull Rods Will Play Important Part in Pumping and Careful Selection Necessary

By CHARLES L. SHIRLEY
Consulting Engineer, Tulsa

When recommending the type and kind of pumping rods to be used at the average East Texas producing property, consideration must be given to the history of operations which in the past have been carried out in similar or somewhat analogous conditions.

Pumping rods are divided into two classes, namely sucker rods and pull rods. Sucker rods are the rods that are used inside of the well tubing, connecting the polish rod to the well pump, and imparting to the pump plunger a vertical reciprocating motion. These rods which are generally made in 25-foot sections are connected together by threaded joints. In contrast, the pull rods are used above the ground, in a horizontal position approximately parallel to the earth's surface. The rods transmit force from the power eccentrics to the pumping jack located at the well head. Pull rods are connected together by bolted clamps, fitted over the upset ends of the rods.

In the early history of well pumping rods were made with hexagonal wooden bodies connected by iron couplings and straps. Later wrought iron round bars were used as rods. At first the joints were welded to the bodies, later the joints being machined from material upset from the ends of the rods. As the loads and stresses on the rods increased larger diameter rods were used, rods in excess of 1-inch diameter having been manufactured. To get more strength without increase in weight mild or low carbon steel bars were made into rods. This, of course, called for a change in upsetting and forging practices. And so in cycles the introduction of high carbon steel, high carbon steel with 1 to 2 per cent manganese, low carbon steels with high manganese content, nickel and other corrosion and fatigue resisting alloys were used, various grades of steel with numerous types of heat treatments and normalizing and quenching have been tried and manufacturers have even reverted to the use of a new grade of wrought iron.

With each change in the metal used in the bars the upsetting, forging and even machine shop practice of the rod factory required changes. During this period the manufacturers and users of sucker rods experimented and together have adopted the standard dimensions from the present A.P.I. sucker rod joint specifications.

These joints have been in use for sufficient time, and in quantities which permit their commercial acceptance. Any rods purchased for East Texas usage should be purchased subject to conformance to the A.P.I. specifications. The specifications are dimensional only and do not apply to the chemical and physical properties of the material.

The joints included in these specifications are the box and pin type joint and the double pin and coupling type joint with coupling. The relative advantages or disadvantages of these two types follow:

Advantages of the Box and Pin Type

1. The box and pin type joint has one less part.

2. It is cheaper to manufacture and usually sells at a lower price.

Advantages of Double Pin and Coupling Type

1. The pin joint is easier to forge and can be upset from high grade steel without causing hidden internal strains or nonhomogenous grain structure, such as may occur when the larger box blank is forged.

2. The coupling can be made from different material than the rod proper. A grade of steel can be used that will make a good joint in the internal machined portion and can be treated to resist external abrasion.

3. The general adaptability of the double pin and coupling type rod and its uniformity of manufacture.

For the purpose of use in East Texas the double pin and coupling type rod is preferable. Rods of this type will be available in wrought iron body and couplings; wrought iron body with steel couplings; mild steel body with either mild steel or hardened and ground couplings; high carbon and manganese steel with heat-treated couplings, and are often made from alloy steel. They have been made from special corrosion resisting metals and are frequently given nonrust treatments.

External paint and enamel treatments have been generally unsuccessful due to stresses within the rod body and the solvent action of the oil and gas. The economic status of the East Texas Field does not allow any but the largest operators to experiment with high priced rods.

The average operator should purchase a standard rod from a reliable manufacturer or distributor.

Sizes Suggested

The nominal size or body diameter of the rods should be based upon the probable loads and stresses. The A.P.I. sucker rod dimensions cover the five-eighths, three-quarters and seven-eighths inch sizes. The average footage of rods required for each well is about 3,650 feet or approximately 146 rods of 25-foot lengths. The usual tubing diameter is 2½ inches with a 2¼-inch pump.

The minimum volume of fluid to be handled at the present time is assumed to be 20 bbls. of oil and 30 bbls. of water daily.

The use of the smaller pump is recommended as it could allow the well to be pumped continuously and reduce the stresses on the rig machinery. However, the use of the larger pump would get the allowable in one tour and reduce labor requirements.

It has been assumed that the well be pumped from the second hole on an A.P.I. standard crank or have a stroke of 34 inches.

This condition gives 0.014 bbl. of oil per stroke with 100 per cent theoretical efficiency. Volumetric efficiency of this size of pump, handling this character of fluid, from this approximate depth, usually varies from 50 to 85 per cent. This is under full time pumping conditions. At the average installation in East Texas it can be safely assumed that under the present conditions the minimum operating efficiency would not be under 40 per cent. Establishing a minimum efficiency of 40 per cent the actual volume produced in each stroke would be 0.0056 bbl.

A speed of 18.6 strokes per minute would pump the allowable in eight hours. A speed of 16 strokes per minute would pump the allowable in nine and one-half hours. Under the economic conditions now existing in East Texas this is the most satisfactory general method of producing by pumping. Except under unusual conditions, long stroke, slow continual pumping with small volumetric barrels or more rapid speed will not give any more satisfactory financial returns. Long stroke equipment will require a greater investment. Slow continual operation will probably require an additional investment for potential taking. More rapid pumping than 20 strokes per minute will tend to cause unnecessary strains upon the equipment.

The pumping speed of 18 and not over 20 strokes per minute has been established. The weight of the rods and oil in tubing is 11,950 pounds. The rods displace about 1,150 pounds of fluid but the buoyant effect is determined from other attributes and functions of fluid flow and displacement.

Estimated Rod Life

A table is given below in which somewhat similar loads are handled by three-fourths inch size of double pin and coupling type rods.

Study of these wells and wells operating adjacent leases show the life to the rods in the heaviest wells to be about 115 days and of the strings having the lesser load to be about 910 days. Computations then indicate the average life of these rods under their operating conditions to be very close to 80,000 rod horsepower hours which is the result of the horsepower per stroke multiplied by the number of hours. From the study of the wells tabulated and of wells having a heavier static load and wells of greater depth, it is very unlikely that the power required per stroke will exceed 15 horsepower with rotary counterbalanced wells or 22 horsepower with a static type of counterbalance. Using eight hours of pumping time a minimum calculated life of 667 and 454 days respectively is derived for a string of rods.

The indicated service can be expected from standard careful operating conditions, good rigs, properly fitted pumps, normal intelligent supervision and first grade rods.

Many recommendations for increasing this service can be used when economic conditions justify the additional expense.

Since 2½-inch tubing is commonly used it would be good policy to use rods with 1⅝-inch coupling diameter, instead of the usual 1½-inch coupling. Particularly so, when hardened and ground or heat treated couplings are used.

Where the hole is crooked or the pump tends to stick, the rods will not drop freely. In this case the use of guides would be advisable.

Combination Strings

Combination strings generally give longer life than straight strings, especially where very little gas is present. Because of the possibility of free floating sand, which will cause tight fitting barrels to stick, the use of a three-quarters inch top, five-eighths inch bottom rods would not be recommended. The sudden application or acceleration of stresses on the five-eighths inch rod would tend to break them.

The increased expense of seven-eighths inch top, three-quarters inch bottom rod string, under prorated conditions will not justify its installation. In this connection, it is well known among production men that the greater percentage of rod failures occurs at the upper end of the string. This is due to the obvious fact that each rod carries the fluid load and the weight of the rods below it. It is safe to conclude, therefore, that the higher the rods in the string the more heavily they are loaded. If this is true, a combination string with the larger diameter rods at the upper end should decrease the tendency of failure. A mathematical analysis of pure tension indicates the proper percentage of seven-eighths inch rods to use in a combination string with three-quarters inch rods. Considering only pump bore the following table is derived:

Pump bore—	Per cent of ⅞-in. rods
1 1/16-inch	25
1¼-inch	27
1½-inch	30
1⅝-inch	34
2-inch	38
2¼-inch	42
2½-inch	47
2⅝-inch	52
3¼-inch	80

When considering plunger friction which causes a tendency for the rods to buckle immediately above the pump on the down stroke, in the case of the 3-inch and 4-inch pumps there is no doubt that seven-eighths inch rods should be run in the lower 20 per cent of the string.

From this, it is obvious that under no circumstances should a 4-inch pump be run with less than seven-eighths inch rods for the entire string, and only in extremely shallow and light wells should anything but a straight seven-eighths inch rod string be run.

Careful Handling Recommended

The useful economic life of sucker rods can be increased by care and attention to details in handling. Several operators claim that pin breaks are almost invariably the result of careless handling; that body breaks are usually found at a point where the rod has been externally damaged during handling.

It is recommended that rod hangers be used if possible.

One common cause of rod trouble is unscrewing. With the A.P.I. type joint now used, it is impossible, when ordinary wrenches are used, to damage the rods by setting them up too tightly. The following table gives the pressures which must be applied to various wrenches in order to safely carry the loads which have been indicated. These figures represent the minimum pressures necessary to preload the rods with a steady pull on the wrench. A quick snap with less pressure will do the same work.

An increase in the rod loads over these values will necessitate a proportional increase in the force applied to the wrench

(Continued on Page 52)

STUDY OF WELL PUMPING RODS

Well card No.—	Depth to pump feet	Counter-balance type	Normal stroke inches	Pump type	Nominal pump size	Rod size inches	Production in barrels— Fluid	Oil	Water	Strokes per minute	H.P. rods	Max. load pounds	Min. load pounds	Range of load pounds	Weight of rods and oil
1-A	3,187	Rotary	33	Plunger	2¼x10	⅞	260	93	167	19	3 78	8,400	2,500	5,900	11,500
1-B	3,187	Rotary	33	Plunger	2¼x10	⅞	260	93	167	19.5	3.24	8,450	2,400	6,050	11,500
2-A	3,930	Rotary	42	Plunger	2¼x10	⅞	310	96	214	10	3.63	9,600	2,200	7,400	9,450
2-B	3,930	Rotary	42	Plunger	2¼x10	⅞	310	96	214	18	7.44	10,300	1,700	8,600	9,450
3-A	3,593	Rotary	54	Plunger	2¼x14	⅞	420	34	386	22	21.67	15,400	4,000	11,400	11,290
3-B	3,593	Rotary	54	Plunger	2¼x14	⅞	420	34	386	24	25.06	16,700	4,200	12,500	11,290
4	4,010	Grasshopper	54	Plunger	2¼x14	⅞	720	290	430	26	29.6	19,600	4,000	15,600	13,950

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FIXED-LOAD
FLUID ELEVATOR

affords a Lower Lifting Cost per barrel of fluid than any other method yet devised

●1. This new device employs an entirely new principle of applying air to the raising of fluid from oil wells. As a result, it is able to lift fluid at a lower cost per barrel than any method now in use.

●2. Full and complete data as to the amount of air used per barrel of fluid, at any given depth, will gladly be furnished those interested on request.

●3. Operation of the Fixed-Load Fluid Elevator is entirely automatic. Well casing is utilized as a compressed air reservoir. Absolutely no back-pressure is placed on the sand. Air valves are automatically controlled by fluid entering the accumulating chamber. A comparatively low air pressure is required because of the small fixed-load of fluid discharged at each cycle of operation. No column of fluid is left in the tubing at any part of the cycle. This eliminates hydrostatic pressure on sand, permitting well to produce more freely.

●4. There is no emulsification of the oil. The Fixed-Load Fluid Elevator does not aerate or jet the fluid. Instead, it lifts the entire contents of the accumulating chamber at one time, and delivers the fluid into the lease tanks without use of pick-up pumps. (Fluid can easily be put into tanks ¼-mile away from well).

●5. The new Fixed-Load Fluid Elevator can be furnished of almost any fluid capacity desired.

●6. The equipment is subject to 100% salvage upon abandoning a well, and the original installation cost is very low. Removal and installation in another well may be done in one day by one crew. The original cost is nominal.

●7. Complete data regarding results of installations in various fields in the southwest, under widely varying conditions, will gladly be furnished to those interested.

●8. Investigation of cost and operation-cost data will prove that the W-K-M Fixed-Load Fluid Elevator raises fluid from oil wells at a lower cost per barrel than any other equipment available.

●

W-K-M Company, Inc.

INDUSTRIAL, PIPE LINE & OIL FIELD EQUIPMENT

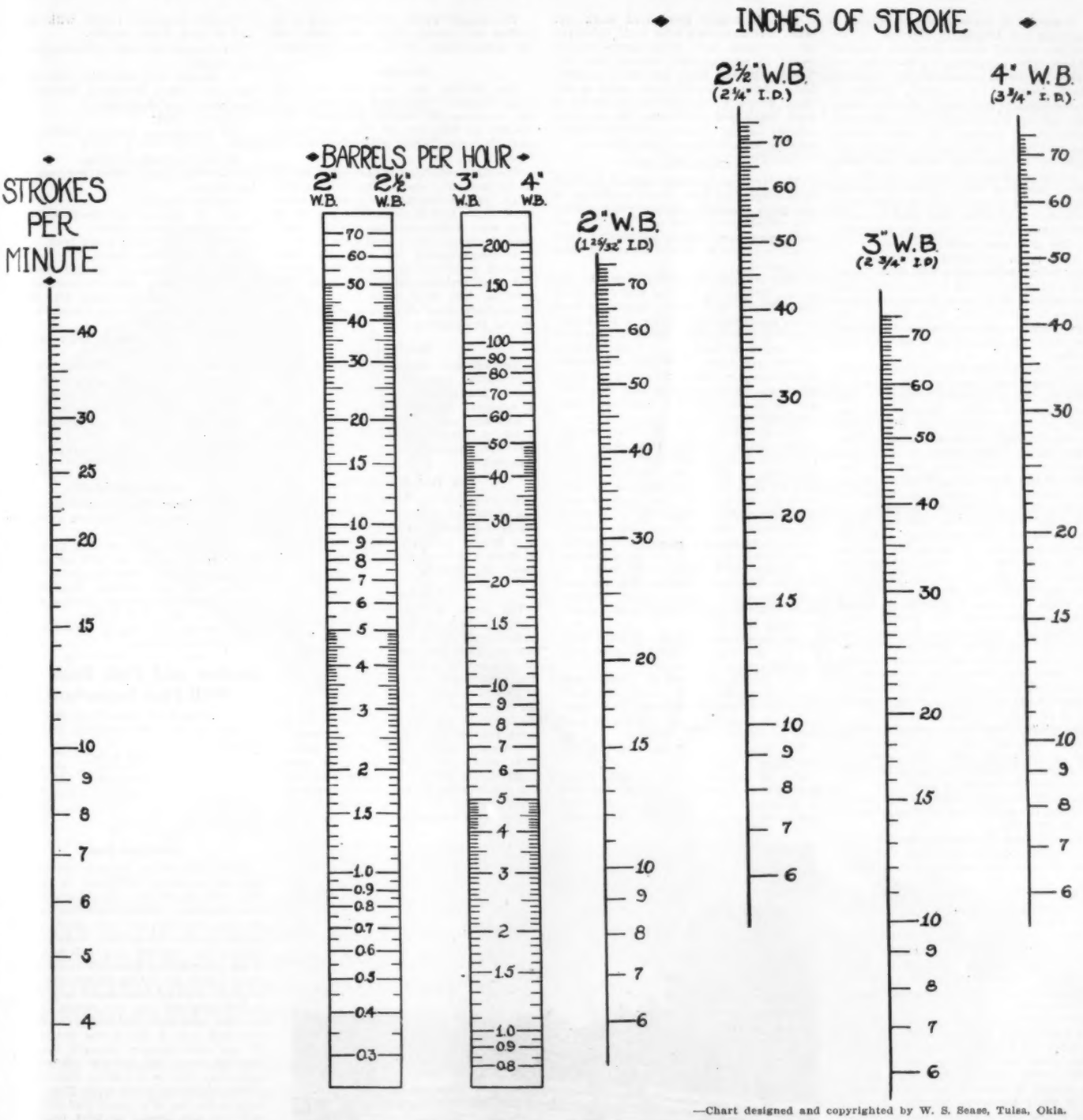
Cable Address "WILKOMAC"

HOUSTON ▲ TEXAS

Export Office

74 TRINITY PLACE, NEW YORK CITY

Working-Barrel Capacity Chart of Advantage in Making Estimates of Operating Conditions



—Chart designed and copyrighted by W. S. Sease, Tulsa, Okla.

DIRECTIONS FOR USE—To find the capacity of a common working barrel in barrels-per-hour, place a straight-edge or ruler on the scale headed "Strokes per minute" of the division indicating the number of strokes the well is pumping and allow the other end of rule to pass through proper length of stroke on the size barrel used in one of the last three right-hand columns of the chart headed "Inches of stroke." On the center column headed "Barrels per hour" under the proper size barrel will be found the capacity.

EXAMPLE—With a 3-inch working barrel operated at 15 strokes per minute and 40-inch stroke, the volumetric capacity of the pump is 22.1 barrels per hour. No allowance has been made for slippage or other variable factors but the table will prove of aid in selecting working barrels and then adjusting rate and length of stroke to well's capacity or allowable.

NOTE—For stroke lengths above 75 inches, divide the stroke of the well by 10; then proceed as usual, but multiply the resulting barrel per hour capacity by 10. Thus, 2½-inch working barrel, 80-inch stroke at nine strokes per minute. Chart reading 1.77 barrels per hour for 8-inch stroke, and multiplied by 10 would represent 17.7 barrels per hour for 80-inch stroke.

Topography and Well Conditions in East Texas Permit Use of Central Pumping Power Units

Economy of investment and operating expenses are frequently obtained by installing central power pumping systems. Where other conditions are favorable one prime mover is maintained at a central plant from which pumping power is transmitted to each well. Since a properly laid out central power has a balanced condition of loading, the prime mover does not need to carry at one time a load equal to the sum of all of the well loads.

A central power consists of a vertical shaft, mounted with horizontal thrust bearings and vertical load bearings or a combination of these. The shaft must be sufficiently braced so that the eccentrics revolve in a true horizontal plane.

Two types of power machines have been built, one having a belt driven band wheel attached to the vertical shaft and the other a ring gear. Power is transmitted to the vertical shaft through the band wheel or gear and transmitted from the shaft by the use of eccentrics and straps.

The vertical shaft rotates once for each well stroke and has a normal speed of from 14 to 20 strokes per minute. The eccentrics are rigidly attached to the shaft in such a manner that they rotate in superimposed horizontal planes. They have hollow discs, straps or slip rings supported on their outer rims, so that although the rings are held firmly against the eccentrics the eccentrics themselves are free to revolve within the rings.

As the shaft revolves the slip rings are prevented from revolving, thus the eccentrics impart an oscillating motion to the pull rods and jacks connected to them.

At equal intervals around the edge of the rings are pins and links to which pull rods lines from the several wells are attached. When the eccentric revolves the oscillating motion given the slip rings causes the rods to move towards and away from the center of rotation a distance which is equal to the eccentricity of each eccentric. Thus a 30-inch eccentric gives a rod motion of 30 inches.

Powers are built to accommodate from 6 to 24 wells and have been successfully used in fields of 4,200 feet depth. In laying out the system care must be taken to balance the wells in order that the descending rods from one well will assist in lifting the rods of the well opposing it on the eccentric.

The rod lines transmitting motion from the eccentrics to the individual wells are made of steel and occasionally wrought iron.

The rods are supported between the power and well upon posts made of pipe with oak blocks for bearings.

There are numerous types of "swings," "multipliers," "hold-ups" and "hold-downs," used to take care for unusual conditions encountered, such as topography, change of direction speed, length of stroke, etc.

Steel pumping jacks are used at the well head. These must be securely mounted either on heavy timbers or concrete. These jacks which change the direction of the power motion from horizontal on the ground to vertical within the wells, are of many ingenious designs.

In laying out a central power pumping system there are a great many details to consider and it is good practice to construct force diagrams that will fully develop all problems of application of power and permit the installation to be so made as to be efficient in operation. A careful survey of the leases and wells to be included in the system is very essential. When this has been made and the field notes reduced to scaled maps the next step is to construct force diagrams to determine how loads can be balanced to the best advantage.

This is highly specialized work but most manufacturers who build this type of equipment have departments experienced in making such layouts and following through with the final installations. As any installations made in the East Texas Field will be in service a good many years to come this original careful survey will be advisable before making installations of this kind.

Geared Powers

The type of pumping power machine well adapted to East Texas conditions is the giant enclosed geared power machine. The prime mover used can be either oil field type gas engine, automotive type gasoline motor or several classes of electric motor.

This machine is sturdy, compact, requires little or no housing and very little maintenance. The machine generally used has a manufacturer's rating of 100 horsepower and is conformable in strength to the largest of band wheel powers. These powers are made in single and double reductions, the single reduction machine using a continuous worm and ring gear and the double reduction using more conventional type gearing.

The enclosed gear powers are of the double crank overpull type. Since the gear unit is completely enclosed the machine can be placed in a sunken foundation so that the rod lines can be kept close to the ground. The overpull construction permits the use of rotating crankshafts mounted on large widely spaced bearings. Great strength, rigidity and accurate gear and bearing alignment is assured with considerable saving in weight. The gears are entirely enclosed with the rigid housing which protects them from external injury and permits thorough lubrication.

The specification of one of these powers of the double reduction gear type follows:

Two cranks are used to lower crank having a stroke of 36 inches and positions for 12-well connections. The upper crank has a stroke of 30 inches and position for eight-well connections.

The overall ratio of the double reduction gears is 20.9 to 1.

The oil capacity is 20 gallons, which is circulated through a filter at the rate of 8 gallons per minute and delivered under pressure of from 10 to 20 pounds.

The overall width of the housing is 69 inches, the overall length 88 inches and the overall height of the power 62 inches.

Gearing

The gearing has been designed with large diameter wide-faced pinions in order to secure low bearing pressures. This insures an efficient oil film lubrication and eliminates failure by compressive fatigue.

The first reduction is through a set of carburized alloy steel spiral bevel gears.

The second reduction is a set of wide-faced single helical gears. The gear is an alloy steel casting and the pinion a heat-treated chrome-nickel steel forging.

A comparatively low ratio has been selected to reduce the operating speeds and to give pinions of more durable proportions. The 20.9 ratio gives a most satisfactory drive with either electric motors or gas engines.

Bearings

Bearings are of the solid thrust roller type having large capacity at no sacrifice in head room or compactness which is essential in this design.

Bearings are selected to give a high factor of safety. Extremely rigid mountings are provided to maintain correct alignment.

Pull Rod Connections

Advancement has been made in the design of the pull rod connections. The bearing is 3½ inches in diameter, operating in a bronze bushing, and supplied with oil from a covered pocket. Alemite lubrication is optional.

Lubrication

The power is lubricated by a simple pump enclosed in the housing and gear driven from the main pinion. The lubricant is filtered by continuous circulation through an industrial purolator. Circulation is indicated by a gauge which may be located either on the manifold or in the engine house. An abundant supply of clean oil is supplied under pressure to every part of the enclosed transmission.

General specifications of the equipment used with this installation using a gas engine follow: The same specification can be used for automotive engine or electric motor with only change in the transmission equipment.

Geared pumping power with 36-inch and 30-inch stroke cranks.

100 horsepower twin cylinder two-cycle gas engine.

11 Section Vee belt drive with 40-inch diameter sheave at engine, 24-inch diameter sheave on shafting.

Vee belt idler.

100 horsepower forward clutch for engine.

30 feet 3 15/16-inch shafting.

4—Self-aligning roller bearings, with baseplates.

Flexible coupling.

Set air starting equipment with gasoline driven air compressor.

250-bbl. circulating water tank.

Belt driven water pump.

General equipment specifications for band wheel power using countershaft:

Underpull pumping power with 36-inch upper and 36-inch lower eccentrics, with 30-foot band wheel.

100 horsepower twin cylinder two-cycle gas engine with clutch.

Floating idler with 15½-foot takeup.

4 bearing, 2 pulley countershaft.

160 feet of 20-inch 7 ply belt.

50 feet of 20-inch 7 ply belt.

Set of air starting equipment for engine.

250-bbl. water circulating tank.

36x36x90x10-foot building.

Surface Equipment

Safety throwoffs or connection clamps.

2-inch pipe pitman between power and knockoffs.

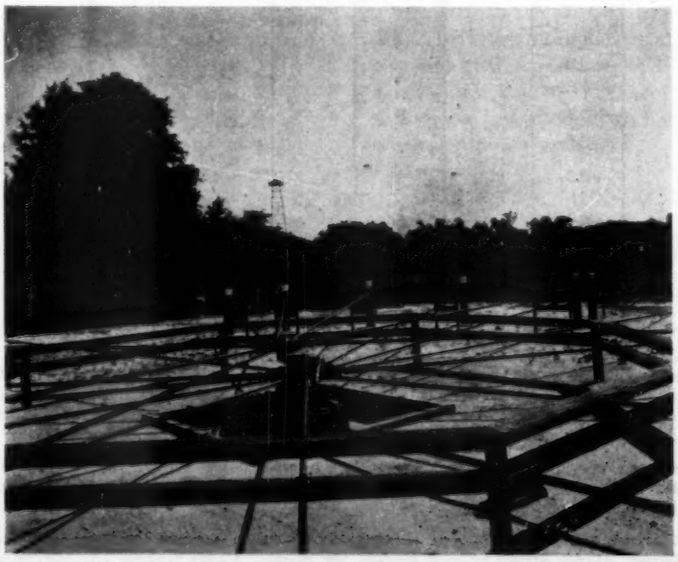
1-inch A.P.I. pull rods with pipe stakes set in concrete and oak pull rod carriers.

Steel underpull pumping jacks.

Sets rod line fittings, consisting of three 1-inch CC stirrups, one eye and eye turnbuckle, 2½ or 3 inches.

Fabricated hold-ups or hold-downs.

Fabricated swings.



The largest power at the present time in East Texas. Connected to 16 wells

Sucker and Pull Rods Will Play Important Part

(Continued from Page 49)

to produce the same result in preloading the pin:

Wrench—	For ⅞-in. rods with 13,580-lb. load (Lbs.)	For ⅞-in. rods with 18,500-lb. load (Lbs.)
18-inch	200	275
24-inch	150	200
30-inch	120	170

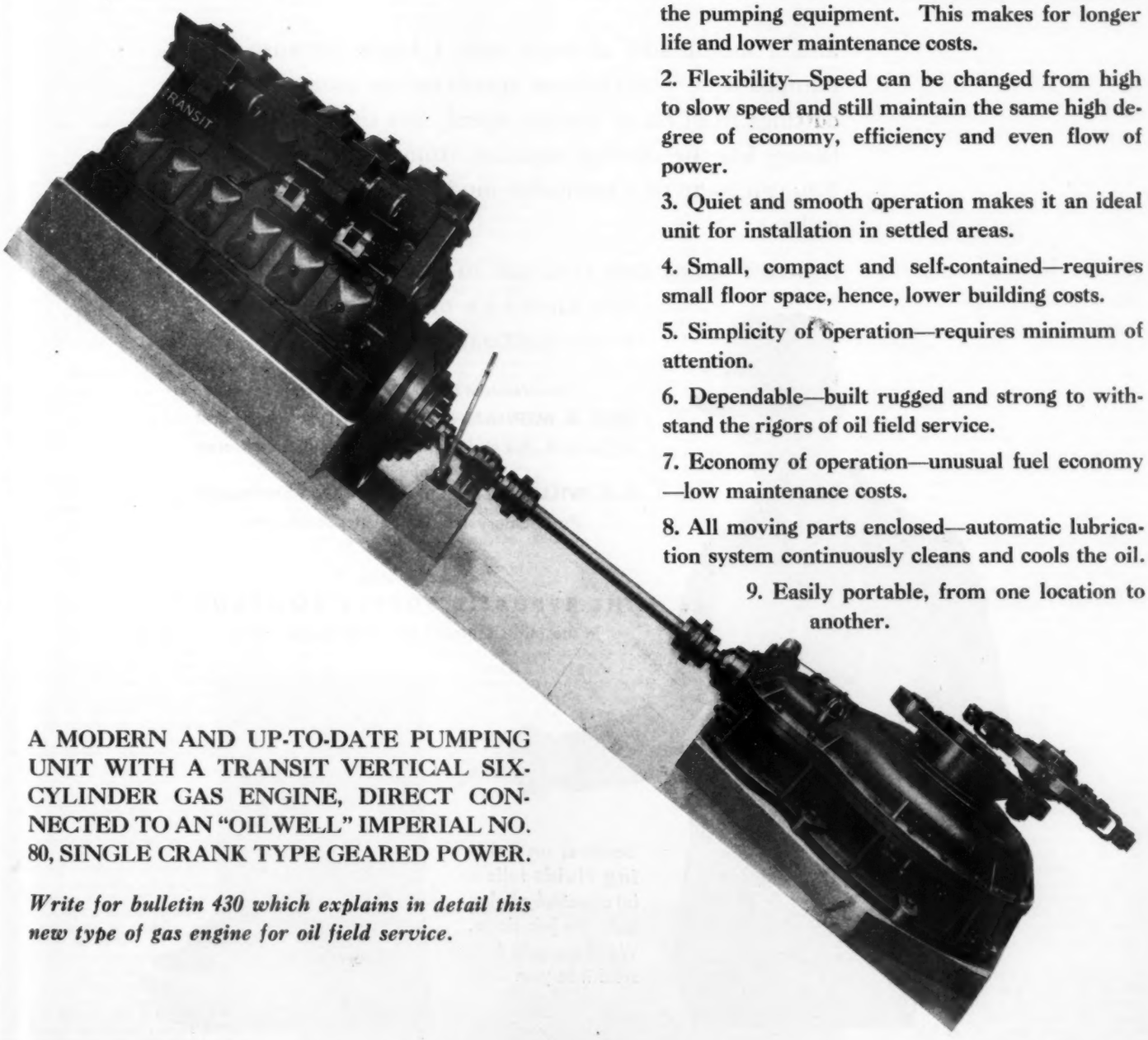
Pull Rod Sizes

Without question, there is considerable loss of mechanical efficiency in the jack and rig machinery. It being granted that a greater force is required to operate the jack than the jack exerts on the sucker rods, it is obvious that a larger rod will be required as a pull rod. Thus if the loss equaled one-third of the power input a pull rod having 50 per cent greater cross sectional area would be required. A seven-eighths inch rod would have 36 per cent more strength than a three-quarters inch rod. A 1-inch rod would have 78 per cent greater strength than the three-quarters inch rod and 30 per cent more than the seven-eighths inch rod.

The conditions existing in East Texas require the use of a 1-inch pull rods. The pull rod line should be kept above the ground and graded in a gentle catenary by the liberal use of wood bushed pipe supports. Tension and alignment can be supplied by the use of hold-up and hold-down supports. Where a well pumps day and night heat expansion and contraction is compensated by the use of parallel clamps or adjustable connection equipment. Connection equipment should be made of cast or forged steel and should contain sufficient material to withstand distorsion either from tension or compression stresses.

TRANSIT VERTICAL GAS ENGINES
FOR PUMPING EAST TEXAS CRUDE

Six-in-line cylinders allow smallest possible angle between rod lines to rear of engine.



A MODERN AND UP-TO-DATE PUMPING UNIT WITH A TRANSIT VERTICAL SIX-CYLINDER GAS ENGINE, DIRECT CONNECTED TO AN "OILWELL" IMPERIAL NO. 80, SINGLE CRANK TYPE GEARED POWER.

Write for bulletin 430 which explains in detail this new type of gas engine for oil field service.

OUTSTANDING ADVANTAGES OF TRANSIT VERTICAL GAS ENGINES.

1. Multiple cylinders produce an even and steady flow of power free from jars, jerks and shocks to the pumping equipment. This makes for longer life and lower maintenance costs.
2. Flexibility—Speed can be changed from high to slow speed and still maintain the same high degree of economy, efficiency and even flow of power.
3. Quiet and smooth operation makes it an ideal unit for installation in settled areas.
4. Small, compact and self-contained—requires small floor space, hence, lower building costs.
5. Simplicity of operation—requires minimum of attention.
6. Dependable—built rugged and strong to withstand the rigors of oil field service.
7. Economy of operation—unusual fuel economy —low maintenance costs.
8. All moving parts enclosed—automatic lubrication system continuously cleans and cools the oil.
9. Easily portable, from one location to another.

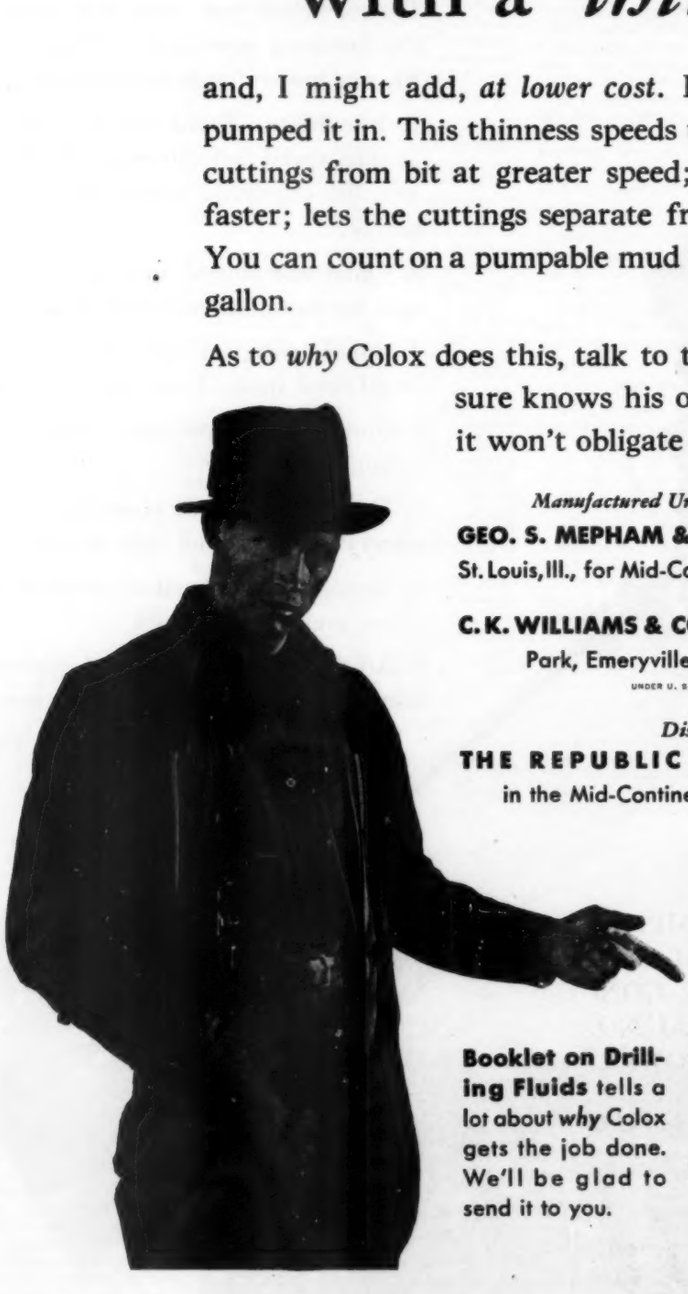
NATIONAL TRANSIT PUMP AND MACHINE CO.
OIL CITY, PENNSYLVANIA

NEW YORK . CHICAGO . CLEVELAND . PITTSBURGH . LOS ANGELES . HOUSTON . TULSA

COLOX gives you a *heavier* mud with a "*thinner*" mix

and, I might add, *at lower cost*. I know because I've pumped it in. This thinness speeds up the pumps; carries cuttings from bit at greater speed; lets the gas separate faster; lets the cuttings separate from the mud quicker. You can count on a pumpable mud up to 18 to 20 lbs. per gallon.

As to *why* Colox does this, talk to the "mud hound". He sure knows his onions about mud and it won't obligate you a bit.



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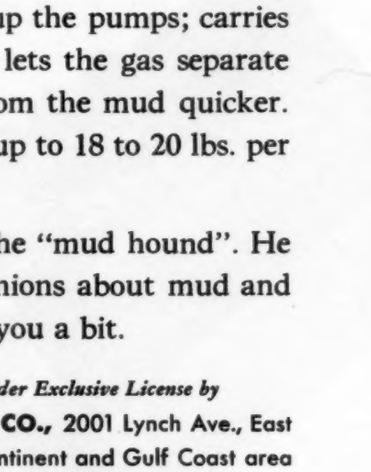


Booklet on Drilling Fluids tells a lot about *why* Colox gets the job done. We'll be glad to send it to you.

Air-Gas Lifts Will Find Ready Application to Production Conditions in East Texas Pool

While the volume of gas in solution in the oil in the producing formation in the East Texas Field is low, being only about 350 feet per barrel, it is planned by many operators to use gas lift for producing some of their wells. There are a number of gasoline plants in the field and from them it is expected to secure enough dry gas to flow at least a part of the wells. Some of these natural gasoline plants are now working on daylight shift only, or about 12 hours daily.

As the wells in this field get older it has been found that many of them will not flow naturally after they have been shut in for a while. The bottom hole pressure is so low that the column of oil devoid of gas exerts too great a pressure against the face of the sand and the wells have to be agitated in some way to bring them back on production.

Swabbing and agitation with rods has been followed, and it is understood that a few companies have already secured special permits from the Railroad Commission of Texas to kick their wells off with gas pressure. Other companies are making application for such permission. Some wells will have to be produced with continued input of gas, others will deliver their quota of oil under intermittent flow conditions.

The application of gas lift to East Texas wells does not involve any special problems. The petroleum engineers have had a lot of past experience in installing gas and air lift plants and this will aid them in working out their problems in this field.

Theory of Gas Lift

Prof. Lester C. Uren has briefly described gas lift as follows:

"Flow is induced or assisted by forcing compressed air or natural gas into the well under appropriate pressure and in sufficient volume, either down through the tubing or through the space between the flow tubing and the well casing, depending upon the path determined upon for the rising oil. The gas so introduced becomes occluded or entrained in the oil, lightens or 'aerates' the oil column, and by its effort to expand, carries the oil with it to the surface.

"After the tubing has been run into the well the fluid will rise inside of it and in the annular space between tubing and well casing to form a common fluid level. If compressed air or high pressure gas is then forced down the tubing the fluid level will rise in the casing as the level in the tubing is depressed. When all of the fluid has been forced out of the tubing the air or gas then enters the casing and becomes entrained with and aerates the column of fluid. As the gas rises it expands, carrying the oil with it to the surface.

"As the column of oil and air or gas rises in the casing there will result an increase of back pressure on the productive formation sufficient to oppose further admission of oil to the well. As the aerated oil overflows at the surface this pressure is gradually relieved due to further aeration of the oil in the casing until the oil again begins to enter the well and equilibrium of pressure is restored, completing the cycle.

"The problem presented in gas-lift design is first, to so place the tubing as to secure a maximum yield of oil from the productive sand; second, to make use of a size of tubing that will give the necessary capacity offering a minimum resistance to flow of the fluids and yet permitting of a minimum of gas slippage; third, to employ a gas pressure which will be as low as possible for the necessary lift; and fourth, to operate with as small a gas volume as is consistent with proper lift efficiency. In as much as these factors are mutually interrelated, it is possible only to approach the problem by 'cut-and-try' methods, varying each factor in turn until the best combination is secured."

Slippage

According to Robert Stirling, London, England, in "The Gas-Air Lift Pocket Book":

"The mathematical equation for the working of the air lift can be fully set out, but the most important factor of slippage cannot be calculated, and can only be found by experiment for any combination of conditions. This has been found only approximately for a very limited number of combinations, and beyond these the various values of the coefficient of slippage can only be guessed at.

"The oil string of casing is set near the bottom of the well and closed at the top, with an inlet for the tubing. The tubing, open at both ends, and packed aid tight in the casinghead, is submerged in the fluid to a depth approximately equal to the distance from the surface of the fluid to the top of the well. The height above the level of the liquid is termed the 'lift' and the depth below the surface of the liquid is termed the 'dip'."

Stirling further states:

"The pressure on the formation is due solely to the height of the liquid column in the well, and can be changed only by raising or lowering the fluid level. Only in a condition where the static head of fluid fell to a point where the input gas pressure was greater than the formation pressure would there be an increase in the back pressure on the formation, and when this occurs the gas lift is no longer effective."

Transition Period

In East Texas, as in other fields, there is a transition period between cessation of natural flow and introduction of mechanical production equipment. The formation pressure gradually drops until the weight of the fluid column in the hole is great enough to cut off further entrance of oil and gas into the well. During this period it is usually necessary to agitate the well by some mechanical means to lighten the fluid column and then the well will again deliver its daily production by natural means.

To assist wells to flow their daily allowable in East Texas many operators anticipate using gas as a "kick-off" medium. The fluid level in the wells is high and to lower the starting pressure various types of "kick-off" devices may be placed in the string of tubing so that the column of fluid is divided into relatively short sections.

As the fluid level recedes higher pressures are required to start the well flowing until the time is reached when it is necessary to maintain flowing conditions by the constant input of pressure air or gas. Then the well is said to be on gas-air lift and this may be continued until the time is reached as described by Mr. Stirling in the above quotation when input pressure is greater than formation pressure when the gas-air lift can no longer be used.

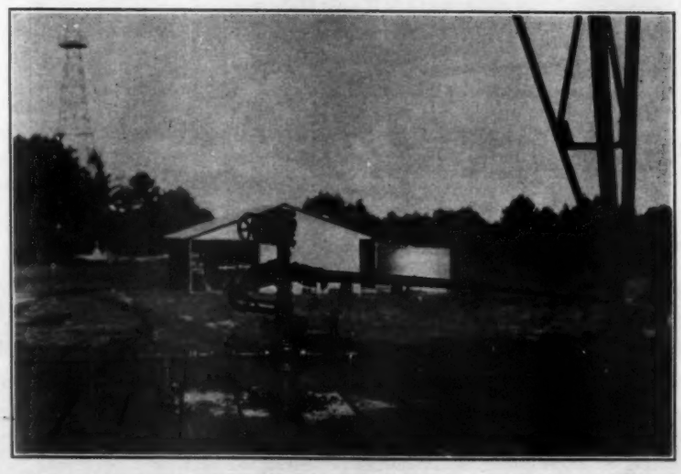
At the present time so little is actually known of the East Texas formation pressure conditions when the wells have passed their natural flowing period that it is difficult to predict just what quantities and pressures of gas will be needed to produce these wells. However, from a practical standpoint exact information on these points is not necessary at the moment because there are various mechanical devices available that can be used in the well to permit their production under the changing pressure condition.

Detailed Data Necessary

To equip a lease for gas-air lift it will be necessary to have considerable detailed information to serve as a basis for calculations. The manufacturers of compressors have developed many units that are suitable for all conditions and by change in the compression cylinders on these units it is possible to vary volume and pressure to suit the changing needs of the wells.

When water makes its appearance in wells in this area it is anticipated that repressuring of the formation will take place. This added pressure will tend to raise the fluid level in the well so that the dead lift of the fluid from the fluid level to the surface will be reduced. However, it is common practice to try to pump off bottom in wells making water on the theory that displacement of fluid at that point aids in bringing fresh oil into the well.

From this general condition it can be understood that the power needed to lift a column of oil and water will vary as the proportions of these two fluids vary one to the other. At first only a small amount of water will be produced with the oil but the percentage of water will increase gradually until the economic limits of production are reached because the quantity of water to oil is so high that it is no longer profitable to handle a large quantity of water to secure a small amount of oil.



Well equipped with gas-air lift in the Joiner area, East Texas, with compressor plant shown in background

Many operators will use residue gas from natural gasoline plants and by switching from well to well will be able to keep a large number of wells on production for a considerable length of time. But as the lifting duty increases and greater pressure and volume of gas is required for the wells it will become necessary to find other means of securing the oil than gas-air lift, or additional compressors must be installed. The plan to be followed from this stage of production in East Texas will be governed largely by the economic conditions governing the individual well or group of wells.

Several units will be used in East Texas that will require compressed gas or air for their operation but do not act in exactly the same manner as straight gas-air lift plants. In general, these units are submerged pumps that are actuated by gas or air pumped to the bottom of the well and operating the power unit located there.

Some are intermittent in their action, others deliver large or small amounts of fluid steadily. Some of the units have been used successfully in many other fields and merely need to be applied to East Texas conditions. Others are now and have been developed from past experience gained in producing East Texas oil.

Production engineers have long been convinced that it might be possible to apply power to a unit located at the bottor of the well with a saving in overall input of energy and in a general way it is this principle that is now being applied to these new units to be used in East Texas.

Many of these units are described in detail in this section and it is understood that permission has been secured from the Railroad Commission to make installations for experimental purposes and the results of these tests will be followed closely by operators in that field and it is anticipated that many wells will be later equipped with these rodless type production units.

As the Railroad Commission of Texas has not yet issued any general orders permitting the application of gas lifts to East Texas wells and has granted only a comparatively few special permits for experimenting with this method of producing wells the gas-air lift problems for East Texas will have to be considered with regard to the conditions existing at the lease. There is also a deficiency of gas available for gas lift work in East Texas unless gas is purchased from natural gas companies with service lines passing through this field.

It is anticipated that gas can be purchased at a low enough price to justify its use for gas lift purposes. If the gas injected into the wells is recycled through compressors in natural gasoline plants it is believed that purchased gas will be satisfactory. As any gas used for gas lift purposes will have to be compressed to higher than 350 pounds pressure for gas lift purposes it is possible that gas lift installations may be economically satisfactory even though a portion of the gas has to be purchased.

The future of gas lift application to East Texas wells is difficult to predict when the field as a whole is considered, but it is quite safe to state that many wells will be produced by this method. There are no mechanical problems that cannot be solved with available equipment and past practice in other fields will be followed by the engineers required to make recommendations as to production methods for East Texas wells to be introduced when the natural flowing life ceases.

East Texas Operators Will Have Opportunity to Secure Improved Design Prime Movers

Regardless of the production method followed at the various wells in East Texas when natural flow ceases, some type of prime mover will be necessary for the reservoir energy will have so declined that there will not be enough left to force the oil to the bottom of the hole and then deliver it to the surface. This decline will be gradual so it might be possible to pump the wells immediately after natural flow ceased with very small power units, but the wise operator knows that it is only a matter of time before the duty of lifting this oil and water will be quite severe and is choosing his equipment now with the future requirements in mind.

There are three types of power available to producers in the East Texas Field, steam, gas or oil and electric. It follows that the prime movers will be either steam engines, with their boiler plants; internal combustion engines to operate on gas, oil and in some few cases gasoline, and electric motors.

It is not anticipated that many steam plants will be used for pumping East Texas wells. There are a few outfits of this kind now actually in operation but they were installed early in the life of the field when a few wells went dead soon after completion. The material was available to the operator at low prices and not desiring to add any appreciable further sum to his investment in a doubtful property the steam plant was secured and erected.

Good steam plants could be used for pumping in East Texas as well as in other fields but the tendency in recent years has been to get away from steam for power on the pumping properties and either internal combustion engines or electric motors have been used extensively.

Internal Combustion Engines

Around most oil fields there is an abundance of gas available for power purposes either for burning under the boiler or use in internal combustion engines. For this reason the gas has been extensively used for pumping purposes. In East Texas this excess gas is not available from the wells but there will be sufficient gas delivered to the wells from natural gasoline plants and from service lines in the field delivering gas from other areas to make up for any deficiency that may occur at the individual well.

The gas engine chiefly used in well pumping service has been the horizontal, single-cylinder type. This engine is well known to operators and there are many manufacturers who have specialized in them for years past so a wide selection of this equipment is available. The vertical multiple cylinder gas engine has also been used for pumping purposes in more recent years and it also is now made by several manufacturers and well suited to pumping requirements.

Whichever type of gas engine is used it is best to mount it upon a substantial concrete foundation. This insures alignment during the pumping life of the well and in East Texas is really necessary for wooden foundations will rot in a comparatively short time and are therefore not well suited for this purpose. Countershafts and reversing mechanism are used for speed reduction and change direction of drive.

Gas engines are made in the two-cycle and four-cycle types. Each type has certain advantages and both are made in a wide range of sizes so complete requirements for any well can be made by proper selection of the unit. These engines range in power from 5 to 200 horsepower but for East Texas wells it is anticipated that the 40 horsepower unit will be the most popular.

Such a unit installed at a beam pumping well will have sufficient power to pump also two other wells by the use of back-side crank takeoff and rod lines. The two additional wells are balanced in the system so the total duty imposed upon the prime mover is distributed so that satisfactory performance is issured.

Gas, preferably dry gas stripped of its gasoline content, is delivered to the engine through a small gasometer which serves to equalize irregularities in pressure. Engines of this type use in pumping oil wells about 12 to 13 cubic feet of gas per horsepower hour. Engines of larger capacity may operate on as little as 9 cubic feet per horsepower hour. Low gas pressure gas is preferable, 4-ounce pressure being sufficient.

The gas and the necessary amount of air to produce combustion are admitted to the engine by the action of mechanically operated valves. For complete combustion 1 cubic foot of average natural gas requires about 10 cubic feet of air. The mixed air and gas in the cylinder are exploded electrically or by the "hot-spot" method, that is, by bringing the gas into contact with heated metal in the form of a tube, bulb or point. Electric ignition is more satisfactory. The electric spark may be generated by a make-and-break device, or by means of a magneto. The engine cylinder is water-jacketed and must be cooled by circulating water.

This cooling water is usually stored in wooden or steel tanks set near the engine house. The 250-bbl. tank seems to have preference for East Texas conditions. The cool water is drawn from the tank and flows by gravity or is pumped by a small circulating pump through the cooling system in the engine and then sprayed back over the surface of the water in the storage tank.

A system of forced feed lubrication is desirable in gas engines of this type, requiring another small pump or lubricator. The pumping engine is usually equipped with two large flywheels or balance wheels, to equalize the loads on the engine, and a suitable governor should be provided to throttle the fuel valve in case the engine tends to overspeed with variation in loading. Some new types of engines have been so designed as to eliminate one of the heavy flywheels and this change is compensated for by the use of a heavy drive pulley.

Gasoline Engine

No discussion of power in oil field service would be complete without some mention of the gasoline engine. Though the aggregate amount of power developed by gasoline engines for pumping wells is relatively small in comparison with other types of prime movers, this type of engine is indispensible for certain kinds of service around the oil fields.

Such engines are confined largely to automobiles, tractors, trucks, portable well pulling machines, purposes for which no other form of power is quite so satisfactory; and these devices contribute in no small part to the success of modern methods of oil development and production. The efficiency and adaptability of this type of engine and the character of the fuel on which it operates are matters too well known to the oil field operator and worker to require any lengthy description here.

Oil Engines

To meet oil field conditions most manufacturers of gas engines have so designed them as to make them convertible to oil engines by a few simple changes in cylinder heads and fuel feeding devices. This type of prime mover will be popular in the East Texas Field and is recommended by most engine manufacturers because it requires only about a half day to convert from gas to oil fuel and the cost is not high. By using this type of equipment the operator is protected against future shortage of either type of fuel.

To change from a gas to an oil feed the cylinder head is removed and the oil head installed. This change permits the use of the oil injector for spraying the oil into the cylinder instead of gas as originally used. The ignition system is not changed for in most oil engines the electric spark is used for firing the charge.

To feed the oil into the combustion chamber it is necessary to spray it and for this purpose a small reciprocating pump is used. This is driven by an auxiliary shaft that usually operates the magneto also.

It is anticipated that the two-cycle type 40 horsepower rating engine will be most popular for straight pumping where cleanout units are used for servicing the wells. On isolated wells the four-cycle engines of the same rating will probably be used as they are best suited for a combination of pumping and cleanout.

With service lines being laid to all parts of the field by the gas companies it is anticipated that ample supply of gas at about 15 cents per thousand will be available for pumping service. The pumping costs will be largely influenced by the type of fuel used and with cheap oil it is possible that many engines will use that fuel. This is a detail that cannot be determined except at the individual well and after a full consideration of all conditions. No preference of fuel is anticipated so far as mechanical efficiency of the engines is concerned.

Central Electric Plants

On some leases it is possible that central electric generating plants will be installed powered with Diesel or semi-Diesel engines driving electric generators. These units will use fuel oil for power and the electric generators will produce alternating current. At the individual wells on the lease electric motors will be set to pump the wells and for servicing portable electric powered units will be used.

Electric Power

The East Texas Field will be serviced by numerous electric power lines traversing the area in every direction and feeders can be strung into every lease. This will permit electric units to be used for all power purposes on the lease and as many wells will be produced with self-contained pumping units the electric motor will best suit their power requirements.

It is anticipated that favorable power rates will be made for pumping duty as well as for well servicing units. Under such conditions the selection of prime movers will resolve itself largely into cost of current as compared with the use of oil or gas in engines. The other alternative is to generate power on the lease by the use of the small plants as described briefly above.

The type of motor used will depend upon the service required of it. The character of service will vary widely. The power and speed variations necessary in ordinary pumping service is relatively small, but it is also convenient to use the pumping motor in pulling tubing and rods, and in other cleanout work, a service which requires more power and greater speed than pumping service. Hence the motor used for operating the wells is usually designed so that it is adaptable to this dual purpose.

For operating pumping powers a motor of fairly constant speed and power output is necessary. Pumping service requires, as a rule, practically continuous operation of the motor, with little or no change in the speed or power consumption once the motor is adjusted to the load. A moderate range of speed control is necessary, however, in order to

(Continued on Page 80-B)

55 H.P. Diesel oil engine at pumping well in Kilgore area, East Texas

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Pump Outfits Will Operate Better If Equipped With Properly Designed Counterbalances

In making installations of pumping equipment at East Texas wells using rods for actuating working barrel valves at the bottom of the tubing strings the use of various types of counterbalances will be quite common. Such installations are usually considered for their power saving values first but recent experiments carried on at pumping wells in various fields have shown that several other advantages can be secured by proper counterbalancing.

Changes in counterweights will tend to reduce the load on the prime movers, smooth out rod motions, reduce impact loads, reduce rod breakages and affect the plunger movement.

In an article by L. S. Thompson, petroleum engineer, Carter Oil Co., published in The Oil and Gas Journal, May 29, 1930, it was stated in part:

"Correct counterbalancing can be approximated from the result of dynamometer tests. The mean load through the cycle is obtained as follows:

"Find the mean load throughout the upstroke by dividing the upstroke area by the length of the card, and translate to pounds according to scale. Similarly find the mean load for the downstroke. The average of the two gives a theoretical counterbalance weight. This figure, however, is applicable only to a deadweight balance. Even there it will be found too high. The momentum of all rotating parts, from the bandwheel to the engine flywheels, acts as an effective counterbalance, and this effect must be subtracted from the weight first determined.

Benefit From Tests

"In some cases production has been increased 5 to 10 per cent by determining safe increase of stroke and speed, and down time has been reduced by adjusting the speed so as to be easier on equipment, and still maintain production. But by far the greatest benefit derived from dynamometer tests, has been in pointing out bad effects of inadequate equipment, and in assisting in replacing it with new equipment far better suited to the requirements of the problem."

The use of a dynamometer to secure data from which correct counterbalancing can be calculated is recommended by many engineers and if the pumping well is considered as a machine the well can be balanced if such factors as friction, acceleration, gas in solution and others are not considered by the following formulas:

Upstroke of the rods =

$$BW + Wp = Fw + Rw;$$

$$Wp = Fw + Rw - Bw.$$

Dowstroke of the rods =

$$Bw - Wp = Rw - Wb;$$

$$Wp = Bw - Wb + Rw.$$

In a balanced machine Wp will be equal on the upstroke and the downstroke and

$$Bw = Rw + \frac{Fw - Wb}{2}$$

Where

Bw = weight of counterbalance.

Wp = maximum force at crank end of beam.

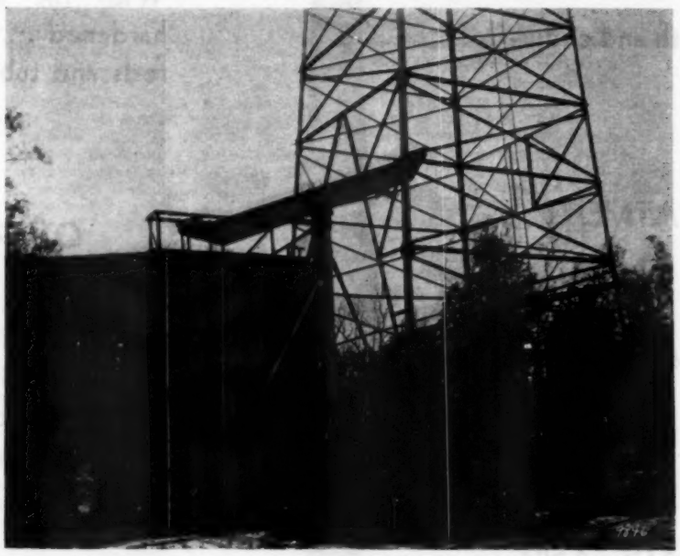
Fw = fluid load supported by valves.

Rw = weight of rods.

Wb = buoyant effect of fluid on rods.

Under these conditions the most efficient counterbalance for power consumption is equal to the weight of the rods plus one-half of the fluid load less one-half the weight of the fluid displaced by the rods.

By weighing the well the correct counterbalance can be accurately determined as all factors affecting the rod loading are taken into consideration. From an indicator card the theoretically correct counterbalance weight is equal to the load on the downstroke of the card plus one-half the difference between the load on the upstroke and downstroke, or, in other words, is equal to the load corresponding to the mean height of the card and conforms to the formula above, with all factors affecting the rod loading taken into consideration.



East Texas well with high concrete foundation to protect it from floods from the Sabine river

Example Is Cited

An example that will illustrate the importance of counterbalancing can be had by considering the stresses involved and the horsepower needed to operate a balanced and an unbalanced machine.

Assume a well with an average load of 7,000 pounds on the upstroke of the rods and an average load of 4,000 pounds on the downstroke. The theoretical correct counterbalance is then 5,500 pounds. From the above formula Wp = 7,000 — 5,500 = 1,500 pounds on the upstroke. On the downstroke Wp = 5,500 — 4,000 = 1,500 pounds and thus a constant belt or gear tension equivalent to 1,500 pounds force at the crank end of the beam on both the up and downstrokes is obtained.

Let the well be unbalanced 1,000 pounds and on the upstroke and downstroke forces of 2,500 pounds and 500 pounds respectively are necessary. Remove the balance altogether and a force of 7,000 pounds on the upstroke is necessary and the rods are driving the crank with a force of 4,000 pounds on the downstroke. The stresses that would be put on the belt, engine and rig, are apparent. If no counterbalance is provided, the prime mover must be adequate to provide the maximum lift of 7,000 pounds but when correctly balanced with 5,500 pounds, a prime mover need only supply 1,500 pounds net force.

The polished rod load will not be affected as readily as the power end by changes in counterbalance. Changes of less than 400 pounds effective counterbalance weight usually produce little change in an indicator card, but changes over 400 pounds may affect the rod load considerably. With electric power, the effects of counterbalancing at the power end can be determined by the use of electric recording instruments. With other types of prime movers the dynamometer is the only practical method available. The most effective counterbalancing, as determined at the power end, does not always produce the best pumping motion and a medium derived from studies at both ends will produce the best results.

Two General Types

There are two general types of counterbalances used, rotary and beam. The beam type is usually constructed on the lease although there are some cast iron weight types of beam counterweights that have been used. There are several types of beam counterweights some made of concrete blocks swung under the pitman end of the beam and others hung between center irons and rod end of the beam.

The grasshopper type counterbalance is also commonly used and consists primarily of a short pony beam attached to the pitman end of the walking beam with connector to the moving end of the second beam that is mounted on a set of side irons placed upon a post set near the door of the engine house. On this second or the grasshopper beam is mounted a weight box and it is adjusted both as to amount of weight and position on the beam by trial and error methods.

This type of counterbalance has given sharper peak loads than the rotary type counterbalance when dynamometer cards have been taken on similar pumping wells. On long stroke and fast pumping speeds the beam balance has particular disadvantages due to the high speed reciprocation of the balance weight, producing certain undesirable inertia effects. To reduce this effect, extremely heavy weights are hung between the pitman and the sampson post.

Rotary counterbalances of several types are being offered and most of these include the feature of adjustable position for part of the weight so as to impart lead or lag to the rotary motion to suit pumping conditions at the well.

Fluid Level in East Texas

For East Texas wells it is anticipated that it will be some time before the fluid level in the casing and tubing falls very low. This statement is based upon anticipated water drive which will tend to keep the hole full of fluid at normal production rates. It is possible to pump down on a water well as on an oil well but when the water flood strikes East Texas wells it is anticipated that this water will flow into the hole so fast that it will not be economical to attempt to keep it pumped down.

Economical production will be limited to securing the allowed amount of oil per day with the least amount of water. Good pumping practice will necessitate good equipment and where rods are used it will be quite necessary to use well designed and installed counterweights. Without good counterweighting it is possible that additional sucker rod troubles will be experienced.

Experience in the Seminole Field in Oklahoma with grasshopper type counterbalances indicated that when properly weighted for the duty imposed upon the engine the pony beam or tailboard and the walking beam when made of wood were often loaded beyond the safe working stress for the wood. Pumping at a depth of 4,500 feet with an effective counterbalance weight of 9,000 pounds unit fiber stress in wood pony beams and walking beams may exceed 2,000 and 1,300 pounds per square inch respectively.

This condition can be corrected by installing on top of the walking beam an inverted king post truss 2 feet high with a steel tension member having a cross-sectional area of 1.3 square inches. The steel rod or cable should run from the well end of the walking beam to the end of the pony beam with the king post centrally located.

However, with all such adjustments and additions made there are still inherent undesirable features in any type beam weight. The momentum of the weight resists reversal and as a result the pony beam hanger slackens at top of the stroke and must carry heavy impact loading at the bottom of the stroke. Counterweights hung from the walking beam do not have such rapid acceleration as the grasshopper counterweights, and for that reason a better balancing effect may be obtained at high pumping speeds by using the latter type.

In selecting counterweight for a well it will be best to consult with a competent engineer or a manufacturer who specializes in this type of equipment for homemade counterweights have not always proven effective in the past and have frequently resulted in high repair costs with excessive shutdown time. As effective rotary counterweights are now available at reasonable prices it is believed that it will pay to install them and during the normal pumping life of a well in this field they will save first costs by efficient and continuous operation.

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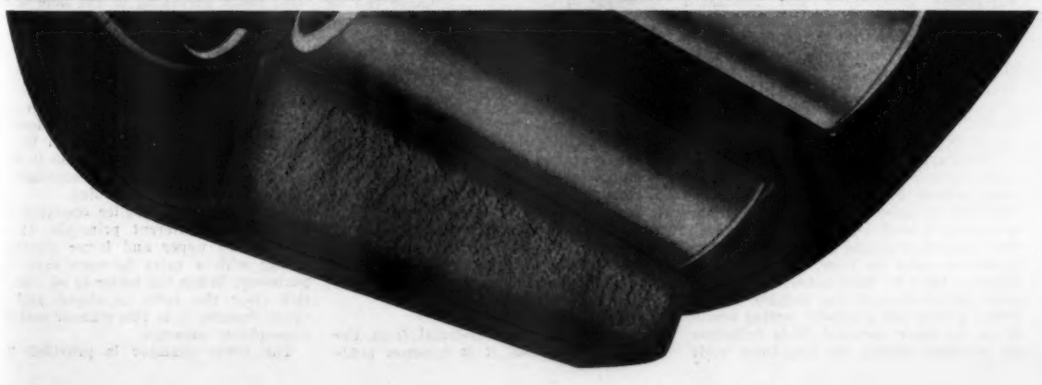

By Following Practices Developed in Other Pools Paraffin Troubles Minimized in East Texas

By J. M. McQUARRIE
Production Engineer, Shell Petroleum Corp., Kilgore, Tex.

The crude oil produced in the East Texas Field, as in many other fields, contains a series of waxes commonly called paraffin which are in a state of solution in the oil at present bottom hole temperatures but which may be deposited on the sand face, in tubing, flow lines, tanks and pipe lines, if conditions become favorable for its deposition.

The formation of paraffin in conductors has long been a source of much trouble in the production of oil and to properly control or prevent its formation constitutes a difficult problem.

The accumulation of paraffin in conductors has not, as yet, become a serious problem in the East Texas Field but, as the field grows older and pressures decline, this trouble may be expected to increase.

The depth at which the paraffin is deposited usually ranges from about 400 to 900 feet from the surface. It has a melting point of about 184° F., which is indicative of low solubility.

Three Major Causes

There are three major causes for the accumulation of paraffin in tubing. These are given below in the order of their importance:

1. Temperature drop in the oil.—The solubility of any given solid in a liquid increases with an increase in temperature. This holds true with paraffin in oil. It follows that by decreasing the temperature the ability to hold paraffin in solution decreases until the saturation point is reached where the paraffin begins to precipitate in small crystals. Agitation tends to cause these small crystals to unite, forming larger grains which readily adhere to a rough surface. The chief causes of temperature drop are two in number:

(a) Cooling by gas expansion: When oil and gas flow from the bottom of a well, the oil is cooled as a result of the gas expanding in the upper part of the tubing and doing work in lifting the oil and gas to the surface. The more efficient the flow, with a consequently greater expansion, the greater the temperature drop will be.

(b) Radiation losses: The amount of loss by radiation depends on the rate of flow, the size of conductor and the difference in temperature between the oil in the tubing and its surrounding medium. At low rates of flow, especially in a large conductor, where the upward movement of the oil is slow and the radiating surface large, the drop in temperature from radiation may be the factor controlling the temperature of the oil produced.

2. Loss of volatile constituents.—This favors the separation of paraffin from the oil in two ways:

(1) By reducing the volume of the oil without reducing the amount of paraffin and thus concentrating the solution.

(2) By removing the lighter constituents of the oil which are better solvents of paraffin than the heavier ones.

However, the loss of volatile constituents as a factor in causing the deposition of paraffin is not as important as the loss of temperature but in heading wells, where gas slippage is great or in wells with leaky well head connections, it becomes of considerable importance.

3. Foreign matter.—The presence of fine sand, or silt, in the oil does not affect the amount of paraffin that will separate from solution but does act as a nucleus for the formation of large particles of paraffin which can become readily attached to the surface of a conductor.

Methods of Control

There are two possible methods of controlling the accumulation of paraffin in conductors, i.e., to prevent the separation of the paraffin from solution in the oil or, if separated, to prevent its deposition on the walls of the conductor.

The factors controlling the separation of the paraffin from solution have already been mentioned. In a well of sufficient pressure to maintain steady flow, the temperature can usually be raised by stopcocking to a point which will prevent the separation of paraffin from solution. The temperature necessary will probably be about 90° F., which will require a production rate of approximately 60 bbls. per hour through 2½-inch tubing. It is not necessary, however, that the rate be maintained daily as stopcocking at a high rate of flow, periodically, will raise the temperature sufficiently to increase the solubility of the paraffin in the oil and clean the tubing which has deposited at the previous low rates of flow.

Where the temperature cannot be maintained high enough to prevent the precipitation of paraffin, the highest velocity possible will assist in preventing the paraffin from adhering to the walls and will tend to keep it in a state of suspension until it is removed from the well.

The method of control by stopcocking is not suitable for low structural wells where there is danger of water encroachment and, in these areas, other methods of paraffin removal should be used when necessary.

A heading well makes the control of paraffin much more difficult. The alternate wetting and drying of a surface is very favorable to the accumulation of paraffin. When a surface is intermittently coated with oil, the film of oil on the

(Continued on Next Page)

Cleaning Out Wells Will Be One of the Early Problems Confronting East Texas Operators

Judged by past experience in Woodbine sand fields of Texas the wells in the East Texas area will require considerable attention to keep them in good condition for producing oil when the natural flowing life is over. It is now known that water is following the oil rapidly enough to create a flooding action on this comparatively soft sand and it seems quite probable that this water movement will dissolve the cementing material from between the sand grains and then wash the sand into the well.

Dr. J. A. Udden in "Review of the Geology of Texas" states the Woodbine formation, also called Timber Creek group and Lower Cross Timbers formation, is made up largely of iron stained clayey sands of brown and red color, accompanied by bituminous laminated layers. Its thickness is 500 to 600 feet near the Red River, but it decreases rapidly toward the south. At Fort Worth it is 300 feet; at Cleburne, 200 feet; northwest of Hillsboro, 95 feet; north of Waco, 45 feet.

"It seems to disappear at the Brazos River. The Woodbine formation has been subdivided into two subgroups, the Dexter sands and the Lewisville beds. The Dexter sands which form the base of the Woodbine formation and which by J. A. Taff have been further subdivided into Basal clays and Dexter sands, consist of a brown and yellow iron stained sandstone with siliceous iron stone.

"The Lewisville beds are composed of laminated sands, iron stained reddish-brown sandstone, shell sandstone and clayey shelly sandstone with lense-like, calcareous concretions and laminated clayey sandstones at the top. Their thickness is about 50 to 100 feet."

This type of formation may be classified as "soft sands" and John R. Suman, Humble Oil & Refining Co., Houston, Tex., in a paper "The Sanding of Oil Wells" in A.I.M.E. Transactions 1925, states in part:

"Sand coming into a properly screened pumping well is a different problem from sand coming into a flowing well under high gas pressure. In a pumping well the movement of sand toward the liner is such that small sand grains move between larger ones to enter the liner. When this condition is ideal we have a footing of large sand grains around the outside of the screen with a size gradually getting smaller as we move outward. This furnishes an excellent footing for long-lived wells and maximum oil production. With this condition there is practically no tendency for the shale layers to cave, as the volume of the sand has not changed.

"This sanding of producing wells inside the tubing and inside the liner is due to one of several causes which might be discussed as follows:

"Pumping wells sand up, in many instances, because so much sand comes in with the fluid that the pumping equipment cannot handle it. This may be remedied by installing pumping equipment of a different type, or by setting the pump at a higher level, so a sufficient fluid head can be maintained on the sand to prevent excessive movement. Of course, when handling fluid making an excessive amount of sand, the plunger pump is the correct type to use.

"In the Gulf Coast of Texas a few operators, in order to cope with a very bad sand condition, are using plunger pumps of regular type with closed traveling valves. This "Marcaroni" pump, as it is called, uses 1-inch and 1¼-inch pipe for sucker rods, and the oil moves to the surface inside the "rods." One advantage of this, is to give the sand-bearing fluid a very high velocity which tends to prevent the sand settling back. Some operators in California have experienced trouble in getting plungers to fit correctly, due to the warping of barrels, and other distortion effects caused by underground heat. To avoid this they have gone to the multiple stage plunger pump, which is simply three of more short plungers and barrels set one above the other.

"Some of the sanding troubles can be avoided by studying the fluid level of the pumping wells, and pumping the wells in such a manner that sufficient heads of oil can be maintained on the sand to stop its movement into the well. This necessitates raising the working barrel to the desired point in the hole."

Reports already received from East Texas operators who have wells making an appreciable quantity of water with the oil indicate that sand is entering the wells in sufficient quantity to necessitate some cleaning out of the hole and it is also cutting standing and traveling valves. The salt water has also caused some corrosion of balls and seats.

Cleanout Methods

To remove foreign material from the bottom of the well it is common practice to use a light string of cleanout tools and bailer. If a set of light bull wheels or cleanout drawworks has been set in the derrick the walking beam pumping outfit can be converted to permit the use of the cable tools. A sand reel or large capacity winch may be used for running the bailer.

The rotary outfit may be moved in to perform this cleanout work and some wells have special provision made in connection with the pumping unit to drive the rotary turntable. Pumps and other equipment needed in connection with the rotary outfit can be moved in and the sand drilled out and flushed from the hole by the usual rotary drilling methods.

While these methods are quite satisfactory they do require considerable rigging up before the cleanout job can be started. They are safe and if the well does not need treatment very frequently will be resorted to by many operators.

Portable Outfits

It is anticipated, however, that many operators will prefer to use some form of portable winch outfit for this cleanout work. These units consist of a large truck with a winch mounted upon the bed and powered from the truck engine. They can be used to pull rods and tubing and then to run in one of the several kinds of sand or suction pumps now on the market.

Some of the portable outfits have been used for actually drilling up the loose sand and sediment at the bottom of the well and for deepening the hole. This practice may be followed to some extent in East Texas although it is not thought that much deepening of the hole will be practiced if water has entered the well.

The sand pump is equipped with valves so arranged that they trap the sand above them as the bailer is moved up and down in the hole. If the material is not packed too solid it can be removed in this manner and any type of lowering and hoisting unit available can be used to run it into the hole just so it has a large enough drum to accommodate the required amount of sand line.

The suction type bailer operates upon a somewhat different principle. It consists of an upper and lower section of casing with a valve between each compartment. When the bailer is on the derrick floor the valve is closed and the upper chamber is in this manner sealed at atmospheric pressure.

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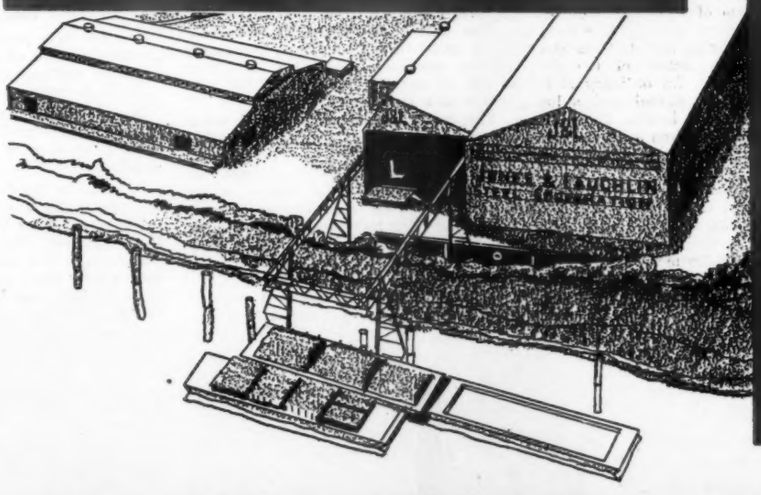

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a valve located at the lower end and when the bailer has been lowered to the bottom of the well and is covered by 400 feet or more of fluid that is standing in the hole the valve is opened permitting this fluid to rush into the upper chamber that has been sealed at atmospheric pressure.

This sudden inrush of fluid under higher pressure than the interior pressure in the upper chamber draws or sucks the sand and sediment into the lower chamber where it is retained by the closing of the bottom flap valve.

As the suction type bailer is hoisted toward the surface a bleeder valve releases a part of the pressure stored up in the upper chamber by the bottom hole fluid pressure so that the sand and debris trapped in the lower chamber can be blown out without too much violence when the bailer is brought to the derrick floor and the outlet at the bottom opened by setting the bailer down over a key attached to the derrick floor and turning the bailer with a large pipe wrench.

This type of bailer has been very successfully used in many fields and it is predicted that it will be well suited for cleanout purposes in East Texas wells.

Liners and Screens

A few operators have set perforated liners or screen pipe at the bottom of their East Texas wells opposite the producing formation. This has been done as a precaution against sand washing into the well and it is thought that many additional wells will be so treated as the salt water entering them increases.

There are several types of well screens and liners. Gulf Coast wells have used this type of equipment for many years.

Tools for setting these liners or screen pipes are available, as well as reamers that can be used to prepare the hole for receiving them. There are also various devices upon the market used for cleaning the screens after they become clogged with fine sand and sediment.

Having access to manufacturers who have had a vast amount of experience in handling soft sand wells it is not anticipated that East Texas operators will have any trouble in securing suitable equipment to run in their wells when needed.

Acid Cleaning

As the production in East Texas comes from the Woodbine sand it is not anticipated there will be much use for acid treatment unless some solvent can be found that will remove the cementing material holding the sand grains together. However, it is possible to treat the paraffin sealed sand with solvents or by other methods if it is found that this material tends to cut off production.

It is too early in the pumping life of the field to make many definite recommendations as to production practice that will be necessary to keep these wells in good condition. However, the operators familiar with other Woodbine fields will have had ample experience to permit them to quickly decide the best methods to follow, and the equipment manufacturers are ready to supply the necessary apparatus and tools on short notice.

Paraffin Troubles Are Minimized in East Texas

(Continued from Preceding Page)

surface drains away until it is too thin and its movement too slow to carry the gummy particles of wax in suspension and these are deposited on the surface. This condition is aggravated by the fact that the surface of the tubing is usually at a lower temperature than the oil with a consequent cooling effect and also permits a loss of volatile constituents from the thin film.

In a well giving trouble from this condition, the only treatment possible is to attempt to gain steady flow by back pressure chokes, changing size of tubing, etc.

Accumulation in flow lines can be minimized by avoiding high spots in the line and arranging, if possible, to keep the flow line full of oil at all times. Separators placed close to the wall assist but the expense of a separator for each well is not justified in this field. Choking at the well head and abrupt changes from small tubing to large flow lines also favors the precipitation of paraffin. A flow line which is buried is free from abrupt atmospheric changes of temperature but, on the other hand, the beneficial heating from the sun's rays is lost. Probably the better method would be to bury the line lightly, leaving only the top uncovered. This would give a neat appearance to the lease and tend to average the other conditions.

The collection of paraffin in tanks is unavoidable as the temperature of the oil in the tanks cannot be prevented from approaching atmospheric conditions. If, however, a permanent connection is made in the tank to allow agitation before each tank is sold, the paraffin can be run with the oil without exceeding the limit allowed by the pipe line companies. Due to the low rate of accumulation in this field, the use of this preventive measure is of doubtful economic value.

Deposits of paraffin on the sand face have not become a factor in producing the oil in this area. The high formation temperature present may effectually prevent this occurrence. However, when pressures decline, and with low fluid levels, the major part of the gas energy may be used in moving the oil into the hole with a consequent gas expansion and cooling effect and paraffin could be deposited on the sand face and in the pores of the sand. At any rate, the tubing should not be set in a pumping well so that the producing sand can be uncovered unless this is absolutely necessary to gain commercial production.

Methods of Treating

The methods of removal, after deposition, may be classified as follows:

1. Mechanical.
2. Chemical.
3. Operating practices.

1. Mechanical

(a) Scrapers.—The use of scrapers in tubing is a positive method of paraffin removal in tubing. These scrapers can be run on a sand line with a suitable hoist, or very satisfactory work has been done with a light form of equipment run on an ordinary Halliburton line. These light tools consist of a rope socket, stem and paraffin knife, or scraper, of the desired size and weight. An ordinary Halliburton stuffing box is used with a lubricator of the desired length. The Halliburton reel is mounted on a bracket on a car and the tools are pulled from the hole by power supplied by belt drive to a pulley on the car wheel. It is usually necessary, with this light equipment, to spud the paraffin by hand. Many different types of scrapers and knives are used, but probably the most satisfactory is one constructed from thin pieces of steel and notched into each other to form a cross and inserted into the end of a tapered bar and welded in place. Additional blades may be inserted at different angles up the bar to give as many cutting edges as desired. This knife will cut the paraffin loose and it can be flowed from the well at intervals. Care should be taken that the tubing is not allowed to paraffin to too great an extent before treatment as this makes its removal more difficult.

For wells capable of flowing the dislodged paraffin from the hole, scrapers are the most positive and economical method to use.

Pumping wells in the East Texas Field have given little trouble but for wells of this class steaming, circulation of hot oil, electric heaters, etc., have been used successfully in other fields. When using steam, the usual method is to introduce the steam into the casing and allow the condensate to collect in the well and be pumped out with the oil. Care must be taken while using steam or hot oil that the expansion caused by the heat does not part the casing, tubing, etc.

Paraffin accumulation in flow lines has given but very little trouble to date. When flow lines are free from sharp bends, scrapers can be used but probably the most satisfactory way to treat paraffined flow lines would be with steam, if available, and if not, with gas heaters installed in the flow line near the well to raise the temperature sufficiently to dissolve the paraffin.

The accumulation of paraffin in tanks requires treatment. The mechanical method most effective is to keep the paraffin down by drawing off from the bottom the amount necessary. If a gravity outlet is not available, a small hand force pump can be used.

2. Chemical

There are three types of chemicals available for the treatment of paraffin, as follows:

1. Preventive.
2. Solvent.
3. Pyrogenic or heat forming.

Preventive chemicals constitute the only class of treatment which can be used in both flowing and pumping wells. Several of these products are on the market and have been very successfully used in certain localities.

The action of preventive chemicals seems to be in the coating of the inside of the conductor and also individual grains of paraffin so that it will not adhere to a surface.

The most satisfactory way of using this type of chemical is by lubrication into the casing. The specific gravity must be such that it will settle through the oil to bottom but light enough to be carried off in the flow stream through the tubing. This treatment, when successful, has the advantage of keeping tubing, flow lines and tanks clean with one operation.

Considerable success has been attained in this field by using chemical in tubing which has become completely closed with paraffin. In this case the chemical is introduced into the tubing and a pressure of from 1,500 to 2,000 pounds per square inch applied with a small hydraulic hand pump. The well is then shut in for two or three days to allow the chemical to work through the paraffin. The treatment is repeated if necessary until the paraffin plug is penetrated.

In cases where the tubing is badly paraffined, but not completely plugged, treatment through the tubing is not so successful, due to the fact that the chemical cannot be held in contact with the paraffin for a sufficient length of time.

Chemicals can also be used for cleaning tank bottoms. The chemical is placed in the tank, which should preferably contain from 3 to 4 feet of oil, and then rolled with gas. This method of treatment will successfully lower high tank bottoms.

Solvents

True solvents cannot be economically used in flowing wells since the quantities which it would be necessary to use would be too large. It is possible that, in a pumping well, a solvent, such as gasoline or kerosene could be used to clean sand faces.

Heat-Forming Chemicals

There are several compounds or mixtures on the market for removing paraffin by the generation of heat, some of which react with water to form heat and others consist of two substances which react together when mixed.

This class of chemical is difficult to use in flowing wells due to the quantities necessary, but are of value for cleaning empty tubing, sand faces, etc.

3. Operating Practices

In addition to the beneficial operating practices mentioned previously it is also possible to clean tubing in a well of high potential by flowing through the casing. This raises the temperature of the oil in the tubing sufficiently to dissolve the paraffin in the tubing. This method is contrary to the rules of the railroad commission and cannot be used.

Conclusion

1. The only practical way to prevent the precipitation of paraffin is by a temperature sufficiently high to keep the paraffin in solution.

2. If the precipitation of paraffin cannot be prevented, high velocity is important to keep it from depositing on surfaces.

3. Due to the fact that gas-oil ratios are practically a constant in the field, this has not been previously mentioned. It is, however, important in controlling temperature. The expanding gas takes up heat mainly from the oil and where the amount of gas per barrel of oil is large, this condition is aggravated. It is, therefore, beneficial, to keep as low a gas-oil ratio as possible.

4. The loss of volatile constituents should be avoided as much as possible by avoiding heading, leaky well head connections, etc.

5. When tubing is badly paraffined, mechanical scrapers can be used satisfactorily.

In tubing completely plugged it is difficult to clean with scrapers and chemicals can be used successfully.

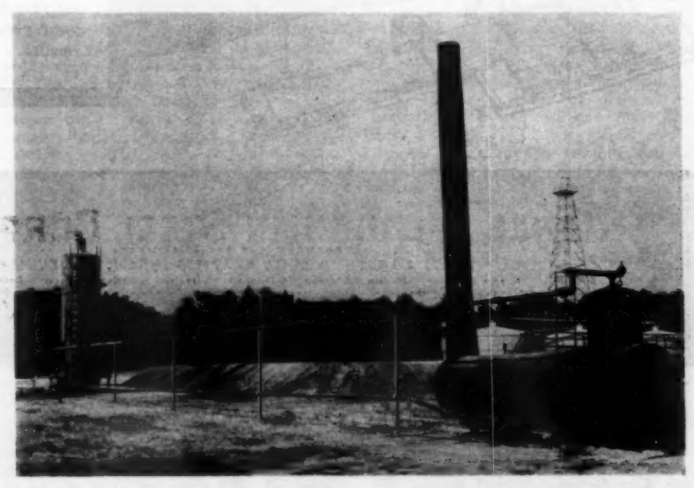
6. It is important to keep conductors full of oil at all times where possible.

7. Tubing in pumping wells should be arranged so that the sand cannot be uncovered.

8. More experimental work is necessary with chemicals to determine the effectiveness and cost of treatment. This method has the advantage, when successful, of keeping the entire conducting system clear of paraffin.

Acknowledgments

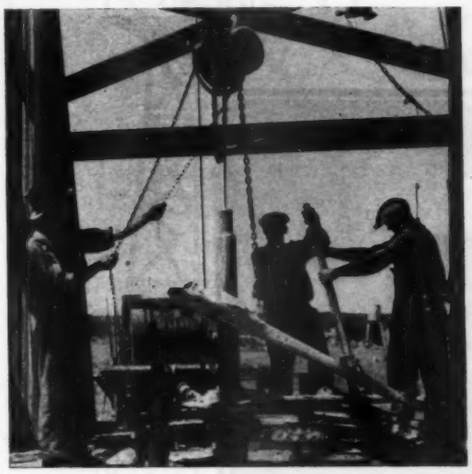
E. S. Durward, Shell Petroleum Corp., Dallas, Tex., and C. E. Reistle, Jr., U. S. Bureau of Mines, authors of papers on this subject which have been freely quoted.



A type of water knock-out installed in East Texas

The FRANKS Truck Motor Driven Well Servicing WINCH

MAKES ANY TRUCK A FAST, POWERFUL WELL SERVICING UNIT



ABOVE—Making up clean out and deepening string of 6¾" tools, consisting of Prosser socket, jars, stem and bit, on Osage County, Okla., well for Devonian Oil Co.

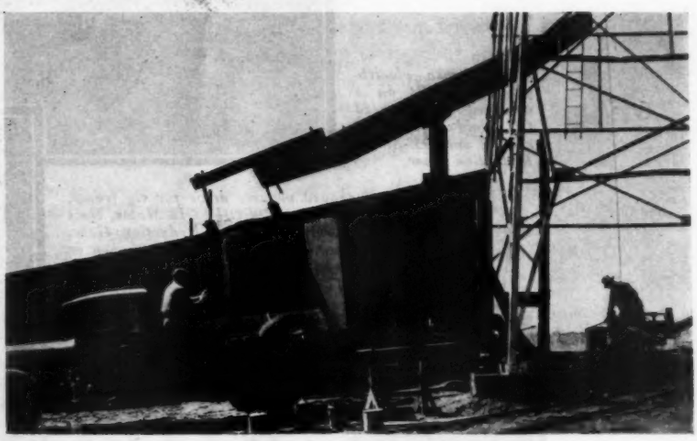
Cleaned Out and Deepened 3 Wells for Cost of Moving in Drilling Machine.

The Devonian Oil Company has successfully cleaned out and deepened 3 wells with the Franks Truck Motor Driven Winch for what it would have cost just to move in and rig up one location with a deep well drilling machine. The TOOL MOTION with Franks Final Drive Plate Friction Clutch has all the snap that can be imparted by the most expensive drilling machine or walking beam with steam drive.

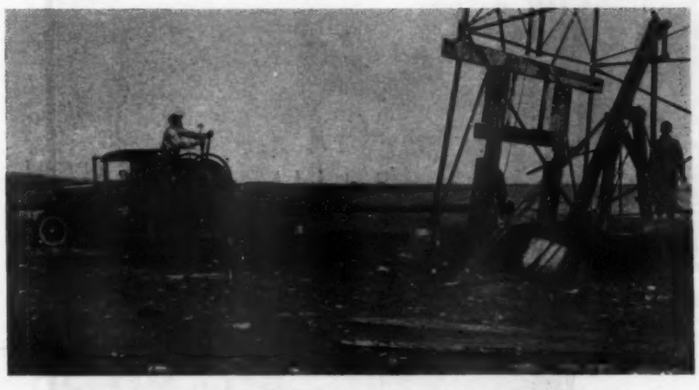
For PULLING and RUNNING RODS and TUBING... BAILING... SWABBING... And ACTUALLY DRILLING WITH TOOLS!

- Final drive friction drum clutch.
- Location of winch directly behind cab leaves truck bed of nearly standard proportions.
- Light in weight.
- Takes drive from truck motor through special gear box behind transmission on propeller shaft of truck.
- Eliminates expensive anchorage installations.

Three Sizes Make The FRANKS Truck Motor Driven Winch Adaptable to ANY TRUCK and ANY JOB up to 7,000 Feet



ABOVE—Pulling rods on a 3,500′ well at Yale, Okla., with Franks Truck Motor Driven Winch.



Pulling tubing on deep well with Franks Truck Motor Driven Winch.

Saved Over $2,000.00 A Month

Three Franks Junior Truck Motor Driven Winches replaced 13 tractors for the servicing of 700 wells covering an area of more than 600 square miles. These units showed a saving of more than $2,000.00 a month under previous operating costs. This with a major company operating in the Glenn Pool, Oklahoma, field.

Franks Unit Replaced 4 Tractors

One Senior Franks Truck Motor Driven Winch replaced 4 tractors for the servicing of 51 wells in the Yale, Cleveland and Jennings, Oklahoma, districts—and at a saving to a major company of more than $1,000.00 a month.

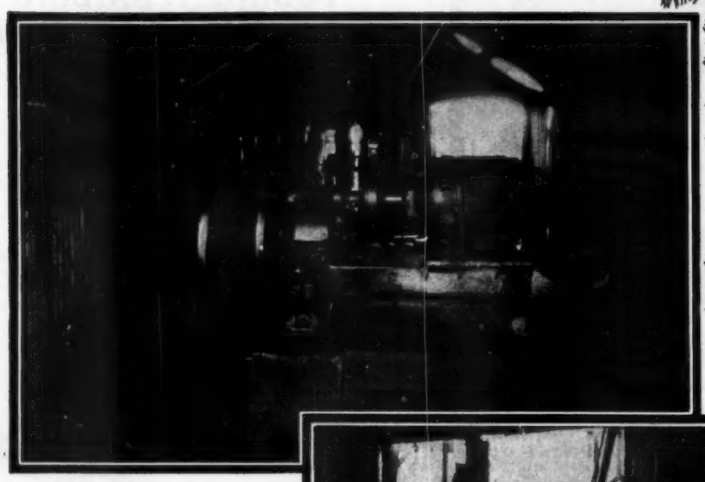
Franks Truck Motor Driven Winches have greater bed space and greater carrying capacity for rod racks, tubing blocks, lines, spiders, etc., because, with Franks construction, under Texas highway laws 7,000 lbs. in addition to winch can be transported on truck.

Write for illustrated folder giving general specifications on Franks Truck Motor Driven Winches; also performance records which show how low cost operation has resulted in more than a dozen major companies becoming fleet owners, operating in Oklahoma, Kansas, East and West Texas. Give model and make of your truck and we will furnish line pull and speed specifications for combination of your truck and desired Franks model.

FRANKS MFG. COMPANY P. O. BOX 1174 TULSA, OKLA.

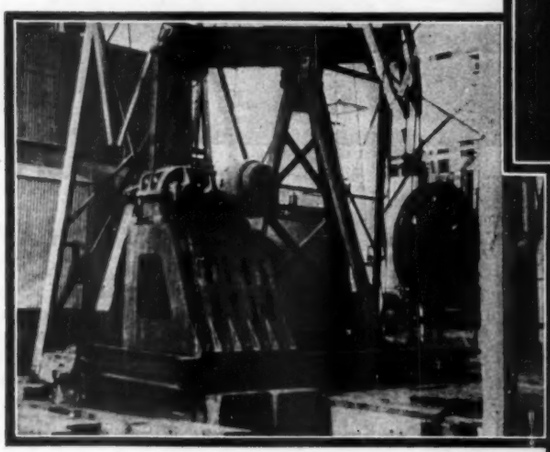
Also Manufacturers of Skid Type and Derrick Floor Winches.

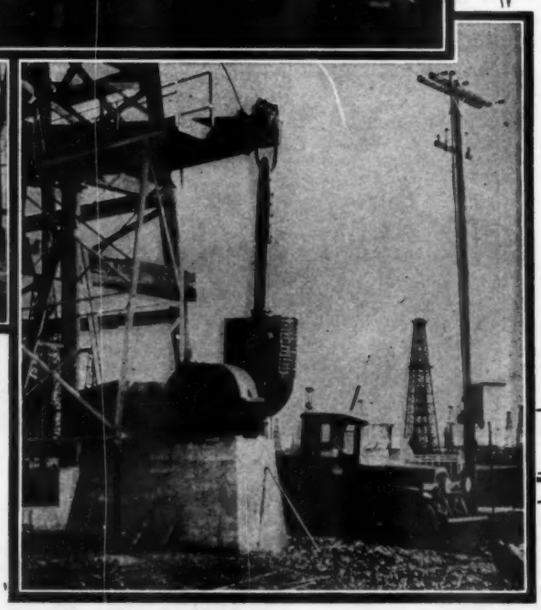
BEFORE FLOWING WELLS



Westinghouse electric pumping outfit on a standard rig—2-speed Oil Field Motor, unit control and OP Single Reduction Gear.

Westinghouse electric drive for rig fronts, consisting of 2-speed Oil Field Motor, Unit Control, and OP Single Reduction Gear. Motors and Control may be either open or gas-protected types.





OP-300 Unit Pumping Power, Motor, Starter, and Reduction Gears are combined into a self-contained, weather-proof unit.

Westinghouse slow-speed electric drive on a beam well. The drive consists of a Linestart Squirrel Cage Induction Motor connected through V-belt to an ODH Gear.

TURN PUMPERS . . . Select ELECTRIC DRIVE

BEFORE the rock pressure fails—before flush production stops and wells must go on the pump—select your electric pumping outfits.

You can get Westinghouse Electric Drives to suit specific pumping requirements of every field.

FOR LIGHT PRODUCERS

Steady pumping of stripper wells individually at very slow speeds has been proved by operating companies to be 400 to 500 per cent more efficient than high-speed intermittent pumping.

For this purpose ODH unit pumping powers are, without exception, the simplest and most economical to install and operate. Pumping speeds as low as one stroke per minute are obtainable.

For beam wells also, slow-speed drives, consisting of ODH reduction gear and motor are available for any pumping condition or arrangement.

FOR HEAVY PRODUCERS

Heavy producers require pumping equipment with sufficient power and mechanical strength to lift large volumes and to overcome high friction and inertia loads. For this service, Westinghouse offers two-speed oil field motors and type OP reduction gears. Besides pumping, these drives also are capable of performing all cleaning and pulling operations.

For beam wells, the new OP-9 heavy-duty single reduction gear provides a direct drive, with either a two-speed motor or a gas engine. A power take-off is provided for driving the production hoist.

For pumping service only, OP-300 unit pumping powers are sturdy, self-contained, weather-proof outfits that keep lifting costs down. The unit-built drive of these pumping powers may be applied separately on beam wells.

WHEN PUMPING SPEEDS MUST BE CHANGED

All of these electric pumping drives for light and heavy producers permit an easy change of speed over a wide range. This flexibility assures the most efficient recovery of oil at minimum operating costs regardless of changing production allowables or changing well conditions.

Westinghouse oil field equipment is distributed by the Oil Well Supply Company and, with the exception of reduction gears, by the National Supply Companies, with offices and stores in all oil fields.

ODH unit Pumping Power for slow speed continuous duty pumping. Drive consists of standard Linestart Squirrel Cage Induction Motor, direct connected or belted to ODH Reduction Gear.

Quality workmanship guarantees every Westinghouse product

Westinghouse

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Ready Availability of Electrical Power Points to Its Wide Adoption in East Texas Territory

Ready availability of electric power in the East Texas Field makes it probable that many operators in that area will adopt it. Several manufacturers of oil-field equipment have been giving special attention to designing self-contained pumping units using electric motors, some driven through reduction gears and others using V-belt transmission systems.

East Texas will probably become the proving ground for many pieces of special production equipment. Submerged electric pumps will be used, as well as displacement submerged pumps that will require special equipment on the surface to provide power at the bottom of the well to force the oil and water to the surface.

Town-lot wells in the field where municipal ordinances have made quiet operation mandatory are turning to electrically driven outfits, as electric power is available in every oil-field town in the territory, making it a simple matter to hook onto the transmission lines.

Some companies will use electric motors for their bandwheel pumping units, setting suitable countershafts to reduce speeds between motor and bandwheel.

If large quantities of water are produced with the oil it is probable that special water pumping units will be needed to dispose of it. Just how it will be handled is not now known, but it is possible that small electric motor driven pumping outfits will be set at central gathering ponds on the lease and will pump the water away to some point of final disposition.

Portable cleanout outfits powered with heavy-duty electric motors can be used to advantage in servicing East Texas wells. By such an arrangement it will be possible to power the pumping unit with a small electric motor for the production duty alone, and when the well is to be serviced the portable winch unit can be moved to location and connection made with transformers and switches permanently installed at the well.

Extensive Transmission Line System

An extensive system of transmission lines criss-crosses the field, with feeders from the main lines to all points. The main transmission system is that of the Southwestern Gas & Electric Co. Two 66,000-volt transmission lines feed this system at the north end of the field, and two more 66,000-volt lines feed the same system at the south end of the field. This provides four-way feed into the area to assure continuity of service. The accompanying map of the transmission system shows the location of major lines and also the 11,500-volt network which distributes power throughout the field.

The four-way feed into the system is designed to guard against major interruptions. If trouble develops on any transmission line, the remaining lines will handle the load, feeding either from the east or west.

Power is supplied from the main generating station of the Southwestern Gas & Electric Co. in Shreveport, La., where 40,000 horsepower is available. Interconnections on the west connect the system to the Trinidad station of the Texas Power & Light Co., from which an additional 40,000 horsepower is available. Additional interconnections and generating stations provide 15,000 horsepower more, making a total of 95,000 horsepower available if needed. This is believed ample to handle the needs of the entire field, present and future.

Distribution throughout the field is from six major substations, located with reference to centers of load. These stations transform from 66,000 volts to 11,500 volts, the voltage at which the field is supplied. Secondary transformers reduce the voltage from this network to any required voltage. Service is usually supplied at 11,500, 2,300, 440, 220 or 110 volts.

The 11,500-volt network is looped throughout the field, assuring maximum continuity of service. Faults on any section of line can be cut out and service maintained on the remainder of the entire network.

Minimum of New Investment

Rates for electric service in the East Texas oil field are low. The company had a system of main transmission lines throughout the field before oil was discovered, and because of this has been able to serve the oil field with a minimum of new investment. This has permitted the company to offer rates which are much lower than those usually available for oil field service.

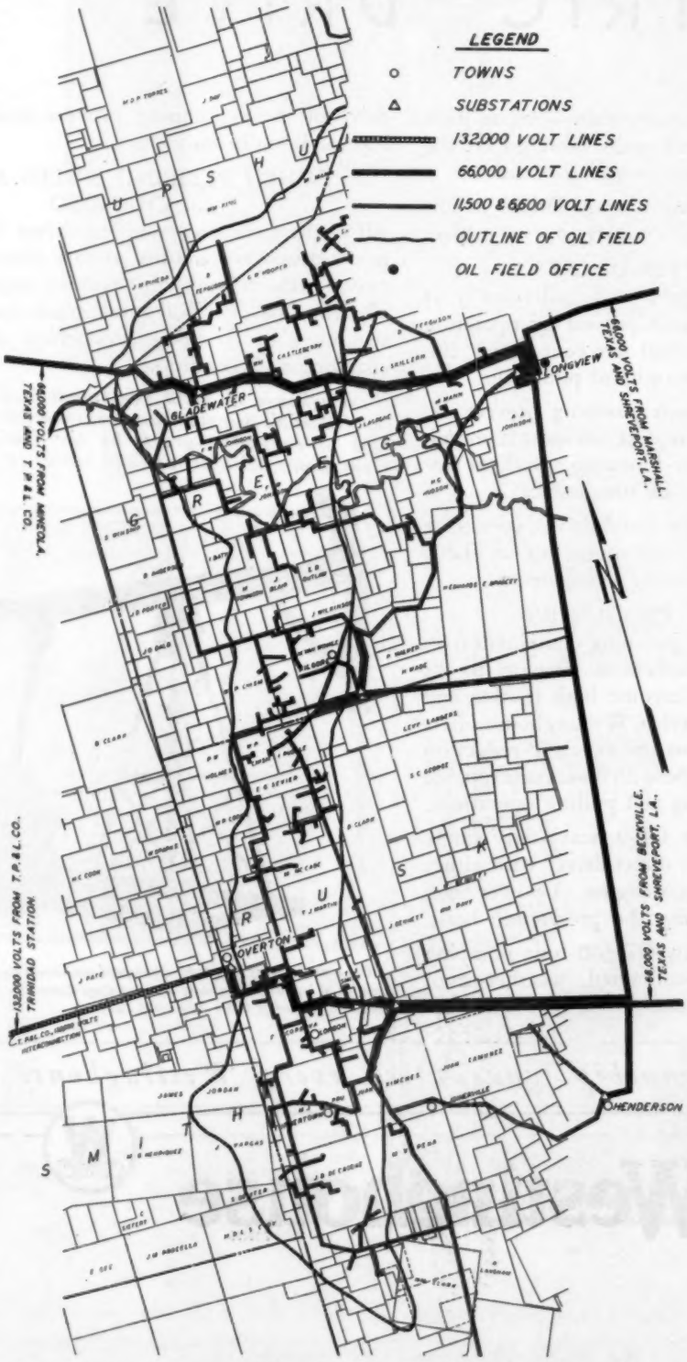
Rates in the field have been lowered twice in the past three years. Very recently rates were again revised downward to provide a basis that would permit pumping with electric power.

The characteristics of oil industry operation have been taken into consideration in designing these rates. The power company consulted executives of many major and independent oil companies, and the present rates are said to be well adapted to oil operations in a prorated field.

Taking into account the experience of other fields where the pumping cost per barrel of oil lifted with electric power has increased rapidly with increased water encroachment, the power company has designed a rate that decreases with increased consumption, thereby lowering the total lift cost per barrel of fluid, and tending to hold constant the lift cost per barrel of oil recovered. This type of rate enables the operator to operate with electric power throughout the life of the field without being heavily penalized by encroaching salt water. Because of their low first cost and high operating efficiency electric pumping units have found favor in the East Texas Field.

Experience is said to show that the constant torque and speed of electric drive reduces rod breakage. This promises to be an important point in East Texas. The reason given for lessened rod breakage with electric drive is that constant speed and torque reduce the hammer on the rods at the bottom of the stroke.

Records from a large number of electrically driven wells are said to show that shut-down time averages only 4 per cent. Electric drive therefore may be expected to increase production about 3½ per cent. At this time this factor is not of much importance in East Texas, but the history of the field will follow that of other fields and continuity of operation will come to a point of importance.



Transmission line map of East Texas oil field. Southwestern Gas and Electric Company

Oscillograph Study Reveals Interesting Pumping Facts

For the purpose of determining power requirements, stresses on surface equipment, effects of counterbalancing and other factors, records have been taken from tests made with telemeters, tachometers, ammeters, voltmeters and timing devices so connected to an oscillograph that six variables were simultaneously recorded under various conditions of well operation, resulting in the following conclusions.

Variable well reactions imposed upon surface equipment heavy stresses that are magnified by prime movers with heavy inertias and reduced with prime movers of small inertias.

A rotating type of counterbalance on the crankshaft gives maximum beneficial effect.

Torque on crankshaft with change in counterbalance are slight with band wheel drive, but the motor torque variations are definite.

In gear drives the best counterbalance indicates best behavior throughout the whole drive.

On electrically operated wells the best criterion of counterbalance is equal current peaks for the well and the counterbalance.

Motor wells are counterbalanced best by means of graphic ammeter, wattmeter or tachometer.

Counterbalance (on geared drive) giving minimum motor heating produces best operating condition on all surface equipment.

Extreme overloads on motor result in higher power bills.

Rod stress is an insensitive indication of counterbalance.

Differences in time on up and down stroke of the polished rod is not a criterion of correct counterbalancing.

• TWO TOOLS FOR TOUGH JOBS!

GRANT Hydrostatic Bailer

LOW-COST operation, utmost dependability and long time service characterize the performance of the Grant Bailer.

Utilizing the natural hydrostatic pressure in the well and the atmospheric pressure at the surface of the ground, this tool assures most effective results for the operator.

HOW IT OPERATES

The loading chamber is sealed by a brittle composition disc. A plunger, held in position by a sliding shoe, breaks this disc when the shoe strikes the bottom of the hole. This allows the hydrostatic pressure of the well to force mud, millings, sand, pieces of junk and other debris into the loading chamber, filling the Bailer instantly to its full capacity. The load is maintained under sufficient pressure to assist in quick and easy dumping at the surface.

ALWAYS A PERFECT SEAL

A new disc each trip assures a perfect seal and saves time ordinarily lost in replacing cups or steel valves cut by the sand. This is an *exclusive* feature of the Grant Hydrostatic Bailer.

MAY BE USED AS A FISHING TOOL

This Bailer is entirely free from complicated parts. It may be used as a Fishing Tool by attaching a basket at the bottom of the shoe, which will retain pieces of iron and other materials small enough to be lifted by the action of the well pressure but too large to enter the Bailer.

GRANT Perforation Cleaner

TO insure an unrestricted flow of oil from a well's producing zone, it is necessary to remove mud fluid and other obstructions from the formations. This is best accomplished with the Grant Perforation Cleaner.

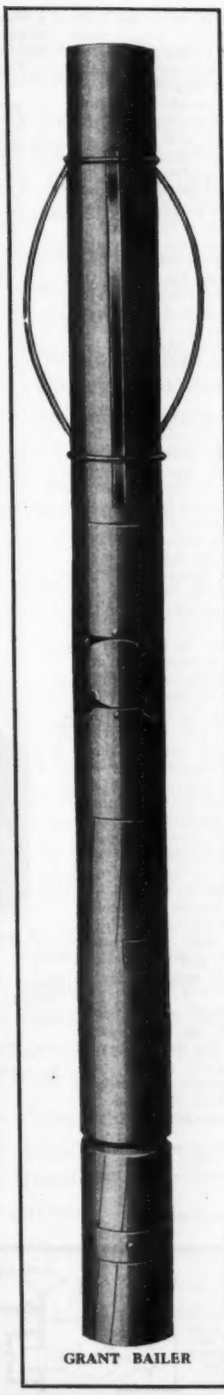
Its operation is similar to that of the Grant Bailer, except that the action is concentrated on a limited area of perforations. A strong flushing action set up through these perforations thoroughly cleans the clogged formation.

By raising the tool slightly, the seal is broken and the hydrostatic pressure forces mud, paraffine, sand, etc., that have been washed from the formation, into the loading chamber.

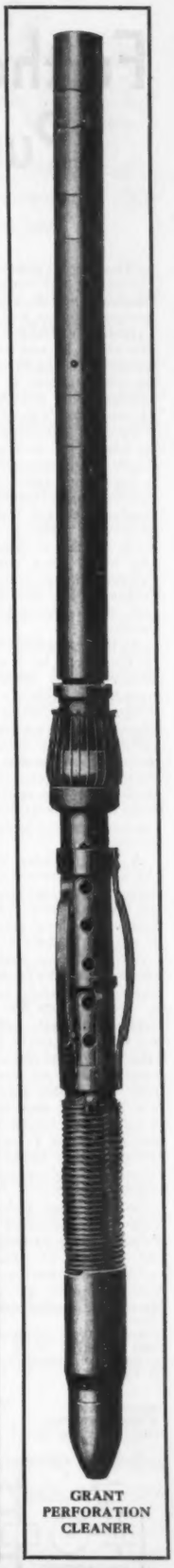
The simple, rugged construction of the Grant Perforation Cleaner makes it especially suited for use in oversea's fields because parts seldon need replacement and any experienced crew can secure satisfactory results without difficulty.

"Used Where Performance Counts"

Operator is holding cover of Grant Bailer unloading port in left hand. This is removed by a quarter-turn and provides an outlet almost the full diameter of the loading chamber. Right hand is inserting new disc in sliding holder. Simple, no complicated gadgets, thoroughly dependable!



GRANT BAILER



GRANT PERFORATION CLEANER

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Learn the Facts

Be sure to write for your copy of these Booklets, just off the press, illustrating and describing in detail Grant Bailers, Cleaners, Underreamers, Reamers and other Grant tools endorsed by the Oil Industry.

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2042 EAST VERNON AVE., LOS ANGELES, CALIF.

Further Application of Pneumatic Cylinders to Pumping Wells Being Made in East Texas

By H. B. THOMSON
Division Production Engineer, Pure Oil Co.*

The system consists of a central compression plant designed for single stage service, high pressure outgoing and low pressure return pipe lines, and pneumatic cylinders suspended in the derrick over the wells. In addition, regulating devices are installed in the system, together with an air preheater at each well.

Plate No. 1 is a schematic drawing showing one type of installation that has been used. Referring to this plate, it may be noted that the discharge pressure from single stage compressors is controlled by a regulating valve. From the main high pressure distribution line, branch lines conduct the air through heaters to the pneumatic cylinders which are suspended from the top of the derrick directly over the well. After one cycle through the cylinder the air is returned through a low pressure pipe line under regulated pressure to the main compressor intake for recompression.

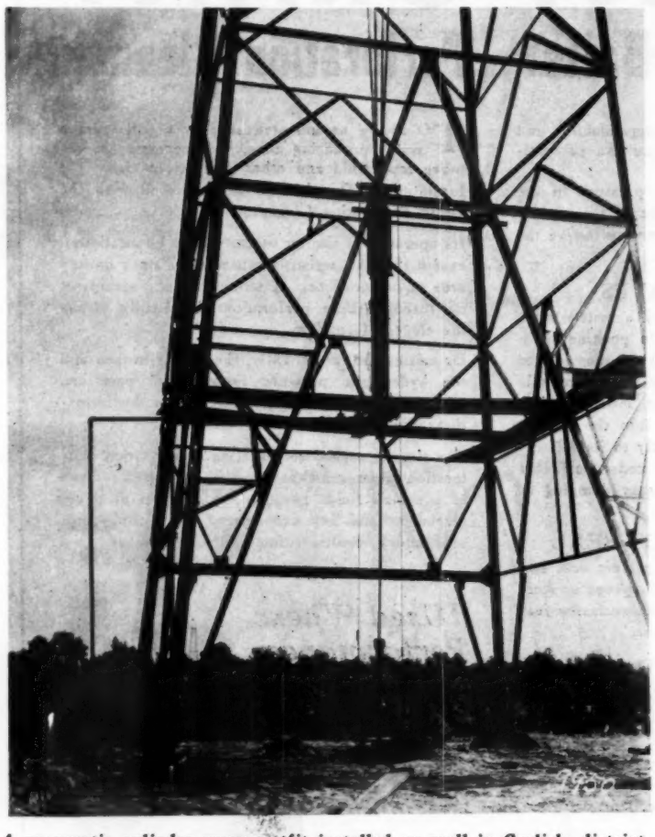
In the operation of this system naturally there will be a small leakage or loss of air or gas from the pipe lines and pneumatic cylinders. A small make-up compressor is installed in the main compressor plant to compensate for this condition. In the schematic drawing the make-up compressor is shown to discharge under control into the low pressure side of the system. However, if high pressure air is available it could be discharged into the high pressure side of the system.

A small tubular heater is installed at the well for preheating to expand air and reduce compressor requirements for pumping. Almost any type of standard line heater capable of raising the temperature of the air to 500° F. is suitable for this service. Heaters equipped with efficient burners and radiating surfaces of refractory materials are usually justified in view of their low fuel requirements.

The pneumatic cylinder is single acting with automatic air operated poppet valves. The valves are actuated by air supplied from air ports in the main cylinder. The ports may be changed to obtain any per cent of cut-off and compression, and length of stroke in 4-inch multiples from 1 to 6 feet. The standard cylinder is made for a 6-foot stroke, although cylinders can be supplied for a 12-foot stroke.

By-pass pipes and ample compression cushion are provided in the upper part of the cylinder to avoid the possibility of any damage to equipment should the sucker rods break or become unscrewed. Automatic shut off valves are used to protect the system against loss of air as a result of sudden pressure release which might occur if the rods break or if the air lines part.

The four rods which suspend the cylinder in the derrick have turnbuckles used to center the cylinder over the well.

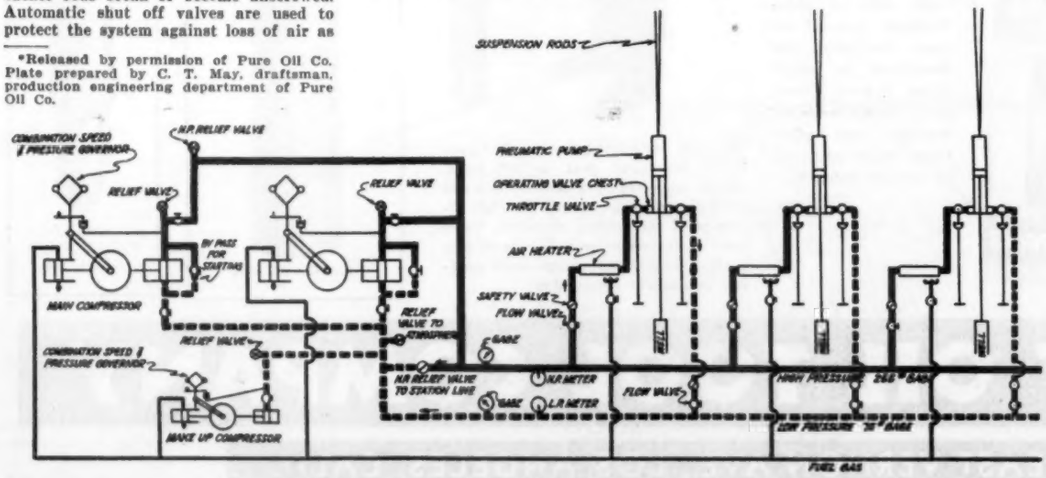


A pneumatic cylinder pump outfit installed on well in Carlisle district, East Texas

Operation

The length of stroke and the speed can be varied within wide limits to meet the producing capacity of the individual wells. In addition to this feature, the cylinder can be regulated to operate with a rapid upstroke and a slow downstroke, which reduces the slippage time past well pump plungers or cups and makes it even more practical to use loose fitting plungers for slow pumping. The pumping speed of the unit can be regulated while in operation by throttle control valves installed at the bottom of the cylinder. Plate No. 2 shows that the inlet and discharge throttle valves can be conveniently operated from the derrick floor by means of extension control rods. For example, if it is desired to operate the pump at a cycle of three strokes per minute with the upstroke at the rate of 15 strokes per minute, the inlet valve may be regulated to furnish the right amount of air and the exhaust valve can be throttled to retard the downstroke, resulting in an average of three working strokes per minute. On the other hand, if a slow upstroke and a rapid downstroke is desired, the intake and discharge valves can be adjusted to meet those requirements.

Since there is a limited force supplied to the cylinder, peak sucker rod stresses are eliminated without sacrificing the rate of production. So free is the cylinder unit from friction that the rod string can be turned with the hand while operating at full load. The rods might be considered to float on a cushion of air, and are uniformly accelerated while air is admitted during the upstroke. The fact that the rods are counterbalanced on the downstroke by back pressure in the cylinder results in a shock proof downstroke and at the same time absorbs energy from the falling rods that might otherwise be wasted. An example of rod service while using pneumatic cylinders can be cited where only one rod break was reported during a period of nine months from a group of six wells that were pumped with pneumatic cylinders, as compared with 18-rod breaks during the previous six months' period when the wells were pumped by other methods.



Schematic drawing of pneumatic pumping system

Flexibility

A pneumatic system having a central compressor plant affords an ideal arrangement to expand the plant capacity as needed, as well as to furnish the varying amounts of power required by individual wells. During the early pumping period of a field, standard surface equipment capable of handling the heaviest wells is usually installed at each well. At the time pumping equipment has to be installed it is often difficult to determine what volumes will have to be pumped. Later on, dynamometer studies of well loads and studies of production records generally will show that the average well may only require a fraction of the horsepower installed and could even be produced with lighter surface equipment. This results in commitments to pumping equipment often in excess of requirements, while the pneumatic system can economically meet the changing requirements.

The greater share of the cost of the pneumatic pumping system is for compressors and pipe lines, both of which are used for many purposes in the oil fields and have a high salvage value. The only special equipment required is the heater, which has but little salvage value, and the pneumatic cylinder which can be salvaged for pumping other wells and has a wide range of application as to depth and production.

Field Tests

Almost a year ago six pneumatic cylinders were installed on wells on the Sina Crow lease of the Pure Oil Co. near Oilton, Okla., operating on air furnished by a compressor that was already installed at a gasoline plant in the vicinity.

Following is a summary of test data which illustrates the performance of the unit while pumping at varying rates of production:

Well data: Depth of pump, 2,640 feet;

(Continued on Page 80-B)

*Released by permission of Pure Oil Co. Plate prepared by C. T. May, draftsman, production engineering department of Pure Oil Co.

IN EAST TEXAS YOU CAN EQUIP FOR LESS AND PUMP FOR LESS WITH CHEAP ELECTRIC POWER

CHEAP electric power in East Texas makes your pumping problem easy. You can get electric power at any well, on any lease, immediately, and it costs you less to equip and pump with electricity. ¶ First cost of equipping with electric power is less than with any other power. There is practically no maintenance on an electric motor. It has one moving part and two bearings. Saving in maintenance and rod trouble often pays the entire cost of electric power for pumping. ¶ We would like a chance to show you the figures. If you need it we will furnish engineering counsel without cost. Phone, wire, or write the Commercial Department, Shreveport, Louisiana.

SPECIFIC ADVANTAGES

1—Electric power is available right now. Our lines criss-cross the East Texas field. No time lost.

2—It costs you less to equip. Electric driven jacks and rigs cost less to buy and install than other types.

3—Your total pumping cost is lower with electric power at the rates in East Texas. We can show you some case records on this.

4—You save enough on rig maintenance and rod costs on an electric rig to buy your power.

5—You have less shutdown time with electric power. You save plenty of time on less rod trouble and time lost on maintenance. Shutdown time is not so important right now, but it will be when the field is really pumping.

6—There are no water or gas lines to freeze up when you use electric power.

7—You can get much better overall efficiency with electric power.

8—For flexibility and controlability nothing can match electric power. It goes to work at the touch of a button. It is always on the job in just the right amount—all you need but no waste.

9—One bill for electric power makes your records easy to keep. You know what it costs to pump, and your costs are not hidden in a dozen different accounts.

10—You have fewer accidents on an electrically operated lease. Properly installed, an electric installation is fool-proof.

11—Your labor cost is less with electric power, and there is a saving on miscellaneous small tools and supplies.

SOUTHWESTERN GAS & ELECTRIC CO.
GENERAL OFFICES - SHREVEPORT, LA.

CHECK THESE CLIMAX-CHRYSLER SINGLE WELL UNITS AGAINST THE FIELD!

KEEP the PROFIT in the BARREL!

Reading time, 4½ minutes; may mean heavy savings to you.

Don't buy your pumping engine in a hurry today and pay high pumping prices ever after. Make comparisons—*point by point,* compare these Climax-Chrysler Units against any other! See why others can't touch them for low first cost, satisfactory daily operation, low maintenance cost. Read the highlights given here. Then let your supply house go into the details!

(1) There are sizes for every pumping job—gear, rig-front, band-wheel or single well.

(2) Ample reserve power at low speed is available. This means low maintenance and long life.

(3) The power is a steady, rapid flow of light impulses; resulting in least embrittling of rods.

(4) Every operation is snappy and effective. Quick acceleration and high speed are available for rod pull.

(5) There are no starved or over-charged intakes—just smooth, even operation.

(6) The power units are light, easy to install and move. No costly foundation or housing is required.

(7) Anyone who understands an automobile can service these units.

(8) Engineered specifically for this country and this service.

SPECIAL FEATURES—Look them over—each a value worth having . . . Pressure lubrication, operates at low speed . . . Tungsten steel inserted exhaust valve seats; minimum valve grinding . . . High compression heads for efficient use of natural gas fuel . . . Water circulating pump . . . Mechanical governor, quickly adjusted . . . Heavy duty oil bath type air cleaner . . . Combination carburetor and gas mixer . . . Battery or magneto ignition . . . Electric starting . . . Instrument panel with switches, ammeter, oil gauge . . . Fuel pump, or fuel tank with filter . . . Radiator, and fan with V-belt drive . . . Complete, weather-tight sheet metal house . . . Twin disc clutch and power take-off . . . Sold for oil field service by

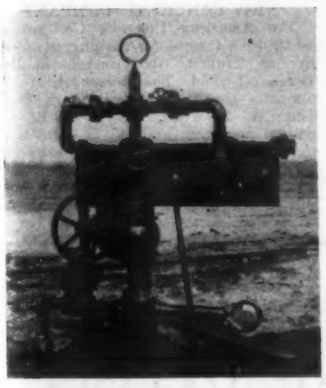
CLIMAX ENGINEERING COMPANY, Clinton, Iowa

New Production Methods Have Been Applied to Wells in Government Wells Field, Texas

By S. F. SHAW
Consulting Engineer, San Antonio, Tex.

The Government Wells Field, situated in Duval County, Texas, was opened in August, 1928, by Schoolfield & O'Byrne when their No. 1 Norton came in for 135 bbls. oil at a depth of 2,347 feet. This part of the field was developed rapidly until it was apparently surrounded by dry holes. In December, 1931, the South Government Wells Pool was discovered by the Duval Oil Corp. when its No. 1 Bishop Cattle Co. came in at 2,308 feet for about 1,500 bbls. per day. The North Government Wells Pool was discovered in 1932 by two wells; Seacord & Putnam's No. 1 Johnson came in for 10,000,000 feet of gas in the Cole sand at 1,567-1,574 feet, and J. S. Suttle's No. 1 Bennett was brought in during June, 1932, for 2,800 bbls. through five-eighths inch choke at a depth of 2,327 feet.

By December, 1932, some 80 producing wells had been drilled in this area and



Surface connections at Byrd Oil Corp.'s No. 3 Wright well in the Government Wells Field, Duval County, Texas

during that year the production of the field was 1,512,000 bbls.

The number of wells drilled in the three areas to June 1, 1932, is as follows:

Area—	Total comp.	Oil wells	Gas wells	Dry holes
Govt. Wells	69	56	2	11
So. Govt. Wells	40	34	5	1
No. Govt. Wells	143	132	4	7
Total	252	222	11	19

Initial production has averaged about 500 bbls. per well. The gravity of the oil is 21-22 degrees A.P.I.

The operators of the old pool are Magnolia, Simpson & Fell, Sun, S. & O., Texas and Trapshooter Riley companies. Those in the South Pool are Duval, Humbye, Magnolia, Texas, Thomas & Tarver, Smith & Capps companies. The companies operating in the North Government Wells Pool are Byrd, Buchanan, H. H. Coffield, Hamill & Hamill, Highland, Edwin M. Jones, Magnolia, Navarro, Reynosa, Parr, San Diego, Central Producers, Inc., Southwest Drilling Co., Texas, Violet, Whisenant & Trenchard, French and Windsor companies.

Geology

The location of these pools has been considered as controlled by faulting, although there is a tendency at the present time to attribute the accumulation of oil to shore line conditions. The mapping of structure from surface indications is not easy. O. L. Brace, in A.A.P.G. Bul., Vol. 15, says: "In mapping the areal stratigraphy many difficulties are encountered, resulting in inaccuracies of interpretation. The rocks of the Eocene age within the embayment have a strikingly similar lithology and with the paucity of primary exposure and the overlap of reworked material and surface gravel, positive determination are in many places impossible."

The gas sand that was found in the Seacord & Putnam No. 1 Johnson is assumed to be the Cole sand and is found at the top of the Fayette formation. The oil sand is found at 2,200 to 2,400 feet in depth, at a depth of several hundred feet below the top of the Jackson group in the Eocene series. The Mirando sand occurs a short distance below the Government Wells sand but so far has not proven productive.

In many wells there appears to be two pays, separated by one or more layers of shale. While there are 50 feet or more of productive formation, this thickness consists of alternating layers of sand and shale. The sand is lenticular, and the productivity of individual wells is affected largely by this condition of lenticularity.

The sand is unconsolidated and care must be taken in flowing wells not to reduce the pressure at the bottom of the wells too suddenly, otherwise large quantities of sand will enter the well, and would also present the danger of the well drilling itself deeper and inviting water encroachment. To overcome this danger some of the producers are resorting to the bottom hole choke, running three-eighths inch choke in 2-inch tubing and one-half inch choke in 2½-inch tubing. This hookup has been found to not only prevent the sand from moving into the well but has had the effect of materially reducing the gas-oil ratio in many of the wells.

Drilling and Completing Wells

All wells are drilled by rotary outfits. A surface pipe, consisting of one joint of 10-inch casing, is set, then a string of 6⅝-inch casing about 2,300 feet long is set just above the producing formation and cemented with 100 sacks of cement. A liner of 5½-inch is employed with round perforations one-fourth inch in diameter, spaced 3 or 4 inches apart both lengthwise and around the periphery of the liner.

Some of the wells are brought in by swabbing. Another method that has been employed by the Duval Oil Corp. and the Southwest Drilling Co. consists in running a string of tubing and bringing the well in through the inner string by using gas from other wells. All the Duval Oil Corp.'s 11 wells have been completed in this manner. Starting valves are inserted in the tubing at certain intervals, depending upon the size of tubing used, and are so placed as to require a pressure of about 250 pounds in emptying the hole of drill mud. The uppermost valve is always placed near the top of the fluid in the well. Where 2-inch tubing is used the valves are spaced from 200 to 300 feet apart. When using 2½-inch tubing they are spaced from 300 to 400 feet apart.

In the gas wells that are drilled along the upper part of the structure the highest initial pressure encountered to date has been 815 pounds. The majority of these wells have a potential oil output of several hundred barrels per day, but most of them are shut in at present, due to their high gas-to-oil ratios. The gas from these wells is thus available for starting other wells when being completed in the manner outlined. This available gas has made it unnecessary to resort to the use of compressors that would have otherwise been necessary. The gas is turned into the casing and within a few minutes the mud is being forced out of the tubing and is turned into the slush pit. The time required for cleaning out a well provided with 2-inch tubing is about 90 minutes before the oil is turned into the stock tanks. When 2½-inch tubing is employed the time so required is about one hour. With a larger casing or with deeper wells, the time required for blowing out the mud would be correspondingly increased.

TABLE 1—DATA PERTAINING TO THE USE OF STARTING VALVES FOR FLOWING WELLS

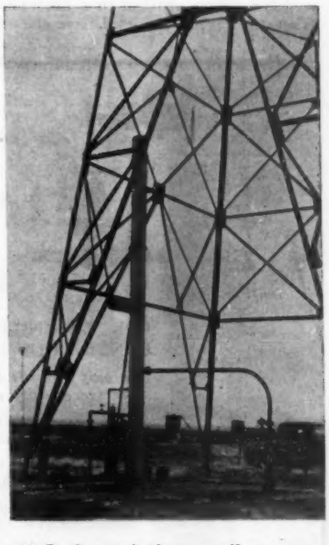
Company—	Lease	Well No.	No. of valves	Tubing Dia.	Tubing Length	Chokes Bottom	Chokes Top	Pressures Casing	Pressures Tubing
Anderson et al	Riley	1	5	2⅛"	2,330	⅝"	..	160	20
Buchanan, Al	Ellison	1	6	2⅛	....	..	..	...	...
Byrd Oil Corp.	Wright	1	7	2	2,300	⅝	..	200	40
Byrd Oil Corp.	Wright	2	7	2	2,300	⅝	..	200	40
Byrd Oil Corp.	Wright	3	7	2	2,300	⅝	..	190	60
Daniels et al	Smith	1	7	2	2,320	⅝	..	160	40
Duval Oil Corp.	Bishop	1	6	2	2,300	..	¼"	600	...
Duval Oil Corp.	Bishop	2	5	..	....	..	..	...	...
Duval Oil Corp.	Bishop	3	3	2	1,000	..	..	...	...
Duval Oil Corp.	Bishop	3	3	2½	1,300	⅝	⅝	510	185
Duval Oil Corp.	Bishop	4	5	2½	2,330	¾	¾	475	190
Duval Oil Corp.	Bishop	5	5	2½	2,340	..	..	480	...
Duval Oil Corp.	Bishop	6	3	2	1,000	..	..	...	...
Duval Oil Corp.	Bishop	6	3	2½	1,350	..	⅝	530	210
Duval Oil Corp.	Bishop	8	3	2	1,000	..	..	...	...
Duval Oil Corp.	Bishop	8	3	2½	1,340	⅝	⅝	490	230
Duval Oil Corp.	Bishop	9	3	2	1,000	..	..	...	...
Duval Oil Corp.	Bishop	9	3	2½	1,320	..	..	...	...
Duval Oil Corp.	Bishop	10	6	2	2,300	¼	..	475	100
Duval Oil Corp.	Bishop	11	6	2	2,300	..	..	625	...
Navarro Oil Co.	Hahl	5	7	2	2,300	½	..	500	...
Navarro Oil Co.	Hahl	6	7	2	2,300	½	..	500	...
San Diego Oil	Bennett	1	7	2	2,300	⅝	..	400	80
San Diego Oil	Bennett	2	7	2	2,300	⅝	..	350	80
San Diego Oil	Bennett	3	7	2	2,300	⅝	..	350	80
San Diego Oil	Bennett	4	7	2	2,300	⅝	..	300	80
San Diego Oil	Heller	1	7	2	2,320	⅝	..	280	40
San Diego Oil	Riley	1	7	2	2,300	⅝	..	300	75
San Diego Oil	Riley	2	7	2	2,300	⅝	..	325	80
San Diego Oil	Riley	4	7	2	2,300	⅝	..	325	80
Southwest Drlg.	Wendt	1	7	2	2,300	½	¼	510	180
Southwest Drlg.	Wendt	3	7	2	2,300	..	¼	...	...
Southwest Drlg.	Wendt	4	7	2	2,300	..	¼	450	200
Southwest Drlg.	Wendt	6	7	2	2,300	⅝	¼	500	200
Southwest Drlg.	Wendt	7	7	2	2,300	⅝	⅝	490	200
Southwest Drlg.	Wendt	8	7	2	2,300	⅝	⅝	425	140
Southwest Drlg.	Wendt	9	7	2	2,300	½	¼	460	210
Smith & Capps	Duval Ranch	1	6	2½	2,300	..	..	...	...
Texas Co.	Freer	3	7	2	2,300	..	..	...	...
Thomas-Tarver	Bishop	2	10	2½	2,350	..	¼	385	255
Whisenant et al	Hahl	2	7	2	2,300	..	⅝	400	150
Whisenant et al	Hahl	4	7	2	2,300	..	⅝	400	150

Note—Out of 252 starting valves used in this field, 92½ per cent were furnished by Western Pneumatic Co., and the others by Gas Lift Engineering Co.

Production Methods

Nearly all of the wells are flowed naturally for a time, especially now that the wells are prorated to 60 bbls. per well per day. When the wells have produced their allowable for a convenient length of time, they are closed in, so that no gas escapes and is conserved for as long a time as possible for flowing the wells. With an allowable placed at 60 bbls. per day, the pressure in the field has not declined rapidly and wells are maintained on natural flow for a considerable length of time, especially where they are tubed and where the production is removed through the tubing.

After wells have been produced sufficiently to reduce the pressures to a point where they will not start to flow when opened, or where water encroachment has started, or where the casinghead is not tight, thus allowing gas to escape and permitting the dead oil to rise a considerable height in the well, there may be some difficulty in starting wells after they have been shut in. In many such cases the wells can be started by swabbing, or if provided with a pump, the movement of the sucker rods will liven up the oil and start the well flowing. Another method that has given satisfaction has been to set starting valves similar to those employed for bringing in the well. With these valves in the tubing, the well may be started with one-fourth the pressure that otherwise would be necessary. In case the natural gas associated with the oil is insufficient in pressure and quantity to start the flow, sufficient gas is admitted from the gas well to start the flow after which the outside gas is closed off.

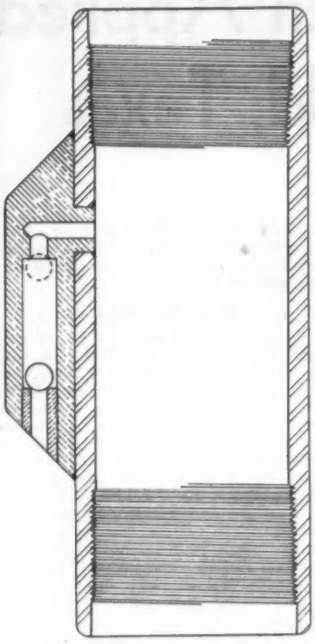


12-Inch vertical type oil-gas separator installed at Duval Oil Corp.'s No. 8 Bishop Cattle Co. well, Duval County, Texas

Data pertaining to the use of these valves is given in Table No. 1.

The wells appear to make considerable sand, especially if open to capacity through the tubing and if not provided

with chokes, either top or bottom hole. This is caused by the oil being flowed from the well more rapidly than it enters,

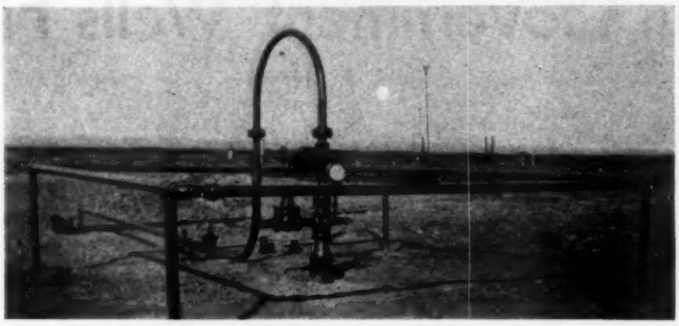


W-P outside collar type kick-off valve used in Government Wells Field, Duval County, Texas

allowing the pressure to drop and permitting the gas in the casing to rush into the bottom of the tubing and carry with it a large quantity of sand that flows into the well when the bottom hole pressure is suddenly reduced to a low point. When the gas is exhausted from the annular space, the flow ceases and any sand that enters and falls back into the tubing may cause the well to sand up, resulting in a clean-out job. The No. 2 Bishop of the Duval Oil Corp. has made several hundred barrels of sand but this has not seemed to affect the starting valves in any way. This well is now making 100 per cent water and is now shut in, but there is no difficulty in starting it to flow under a pressure of 200 pounds with the aid of these valves. Thomas & Tarver's No. 2 Bishop was provided with starting valves from the time of completion and has not yet had a pumping derrick erected at the well since the drilling derrick was removed shortly after the well was brought in. This well was completed in April, 1931, and the casing pressure now stands at 385 pounds and the tubing pressure 355 pounds, and the well flows at the rate of 175 bbls. per day through 2½-inch tubing and one-fourth inch top hole choke when the present allowable of 60 bbls. per day is being taken from the well.

Nearly all of the wells that have been furnished with these kick-off valves have not yet been under the necessity of installing any form of pumping equipment. Provision is so made at the casinghead that the wells can be started by using gas from the shut-in gas wells, after the oil wells have been closed in, if there is need for same. If the pressure or volume of gas in the gas wells should decline to a point where the oil wells could not be started, it would be quite feasible to use semiportable compressors to supply the gas either for starting up the well or for flowing the entire daily production. One well equipped with the valves has declined to a point where it will be abandoned without the need for any other type of lifting equipment or for derrick, and the general condition in the field appears to be such that the same procedure can be followed at many of the wells that have been equipped with this method.

One of the wells on the Humble Oil & Refining Co.'s Paul White lease has been tried out with the plunger type of gas lift, but detailed results are not available as to the performance of the equipment.



Surface connections with cattle guard at Duval Oil Corp.'s No. 6 Bishop Cattle Co. well in Government Wells Field, Texas

A feature of interest in connection with some of the flowing wells is that of a gas separator built of one joint of 12-inch casing set upright at the well. These separators are said to have a capacity up to 1,000,000 feet or even more per day, depending upon the pressure carried, and up to 1,000 bbls. of oil, and deliver a fairly dry gas. The gas contained practically no gasoline vapors, which facilitates the separation.

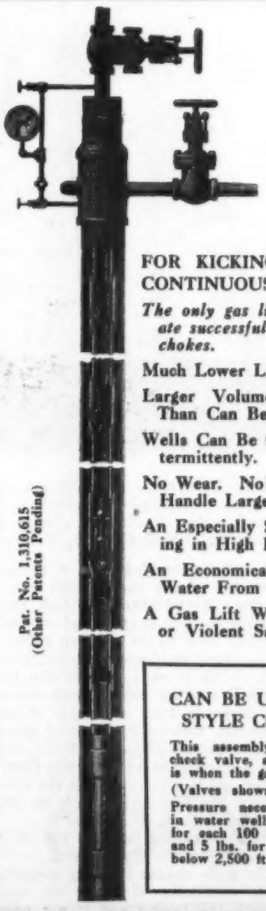
Pulling machines are employed throughout the field for handling tubing jobs. While these jobs are infrequent at the flowing wells, still there must be a means of handling any such jobs that may arise at wells that are not provided with derricks or any form of pumping equipment.

Practically all of the wells in the old pool first opened up are now being pumped either by the beam pump or by central powers. One well in the north end of the pool is on the beam and is reported to be handling 1,600 bbls. of fluid, of which 100 bbls. is oil. In the South pool the wells on two of the leases at the extreme south end are being pumped. In the North pool a few wells have been placed on the beam, while a few other wells are being pumped with pumping jacks pulled either from a standard rig or from a central power.

The oil from some of the wells presents a somewhat difficult treatment problem, and in the north end of the old pool two electrical dehydrators have been installed for the purpose of treating the oil.

NEW CONCRETE COMPANY

The American Concrete Co. has recently been formed for the purpose of delivering Transit Mix Concrete in East Texas oil field. The personnel of this company consists of Carl Short, president; A. S. Field, vice president and general manager; and W. D. Brookover, vice president and manager of sales and purchases. The company headquarters will be in Longview, Tex. Floyd Oldt, will be designing engineer.



Pat. No. 1,310,615 (Other Patents Pending)

MAKE YOUR WELLS FLOW WITH GREENLEE-TAYLOR FLOW VALVES

FOR KICKING-OFF WELLS OR CONTINUOUS FLOW.

The only gas lift left that will operate successfully with small top hole chokes.

Much Lower Lifting Costs.

Larger Volume of Fluid Handled Than Can Be Pumped.

Wells Can Be Choked or Flowed Intermittently.

No Wear. No Pulling Tubing. Will Handle Large Amounts of Sand.

An Especially Safe Method of Bringing in High Pressure Wells.

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A Gas Lift Without High Pressures or Violent Sand Disturbances.

CAN BE USED WITH ANY STYLE CONTROL HEAD

This assembly shows flow valves, check valve, and control head, as it is when the gas lift unit is installed. (Valves shown in open position.)

Pressure necessary to initiate flow in water wells, 10 lbs. per sq. in. for each 100 ft. of lift to 2,500 ft. and 5 lbs. for each additional 100 ft. below 2,500 ft.

Either inside or outside type valves may be used in a well which has any free gas or when outside gas or compressed air is available.

The outside type is used in wildcat or other wells where no gas or air is available and it is necessary to swab tubing to bring in the well.

CONSTRUCTION

These valves are made of a non-corrosive alloy welded into a special seamless tubing collar and fitted with a stainless steel ball (adjusted for size of alloy cylinder and pressure differential desired).

OPERATION

Gas (or air) pressure on the outside of any valve, whenever it exceeds the fluid pressure on the inside, causes gas to pass up around the ball into the fluid in the tubing. This aerates the fluid column (oil, mud or water), and causes same to start flowing. This action is continuous unless, and until, the fluid pressure at the level of this valve becomes thirty pounds less than the gas pressure at that level. (Thirty pounds is the usual pressure differential used in our valves for average wells).

The rush of the gas through the valve under this pressure differential blows the ball against the top seat of the cylinder where, due to fluid tension and pressure, it will remain as long as the outside pressure exceeds that inside.

The next valve below then starts automatically to operate. The operation continues until a point is reached where the well fluid will rise rapidly enough in the tubing to balance (within the the limit of the pressure differential) gas pressure at the level of the operating valve, or until all the valves are closed. Well may be choked at bottom or top, or both, if desired.

FLOW VALVE (Inside Type)

Pat. No. 1,738,974
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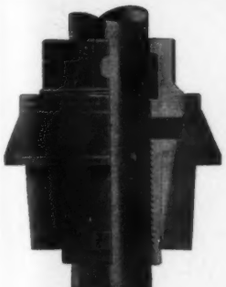

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in pumping well equipment!

The Hercules Tubing Hanger supports the tubing in the casing head—on slips.

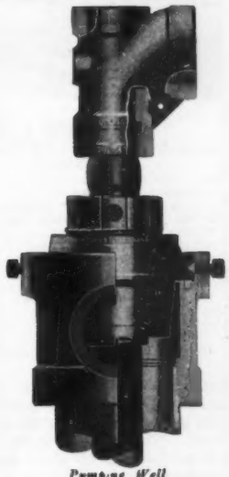
The Hercules Tubing Anchor—a bottom hole tubing support—anchors the tubing at any point within the casing.

The use of these two tools assures 100% Safety to a string of tubing.

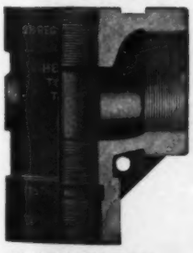
The Hercules Tee—used on top of tubing—with its combination threads—eliminates the use of a swage nipple and other connections to reduce from the upset thread on the tubing to regular well connections.

Hercules Tools are standard well equipment and used in all fields. Write for descriptive bulletins Nos. 1, 2 and 3.

Sold at all supply stores.



Pumping Well "Hook-up"



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Many Types of Rodless Pumping Units Available for Producing Wells in the East Texas Field

It has been stated that the East Texas Field will become the greatest proving ground in this country for various types of production equipment. This is true because many manufacturers have developed new types of equipment during the period of slack buying and are now ready to put these new units and systems into practical use if opportunity is afforded.

While the large majority of wells in East Texas will be produced by old methods and using sucker rods and working barrels many operators will try new methods that are based largely upon the elimination of sucker rods in the well. It has long been recognized that some added efficiency might be secured if the power for lifting the fluid to the surface could be applied at the bottom of the hole rather than at the top as with the sucker rods and most of the basic changes in equipment design have been made along these lines.

Submerged pumps of various types have been tested in various fields and many of them promise to have application in East Texas wells. Up to date no special trouble has been experienced with sand or paraffin in wells in this area and only a limited amount of salt water handled. What changes in proportions of these foreign elements to the oil will take place in the future is hard to predict but unless the sand, paraffin and water increase to large proportions it is not thought any particular trouble will be experienced in using special equipment.

The following brief description of many of these special units and production systems will be of interest to all operators in East Texas Field for each has already had some application there and the manufacturers are ready to follow up these installations at other wells with equipment that is built along lines indicated as best suited to East Texas production problems.

As any equipment to be installed for mechanical production of these wells must be selected for a long period of constant use the problem of first cost is not as essential as continued life with low operating costs. The capital investment can be amortized over a long period of years with the resulting small charge to the individual barrel of oil.

Formation or Injected Gas Utilized in Producing Oil

Fourteen months ago the first installation of the Hughes plunger lift at Pettus, Bee County, Texas, was made in No. 20 Ray by the United Production Corp. This well is 3,932 feet deep and produced, on gas lift, 60 bbls. of 44.5 A.P.I. gravity oil daily with an input gas-oil ratio of about 2,800 cubic feet per barrel.

Plunger lift tubing was set at 3,856 feet, and operation established with a production of 95 bbls. per day, input gas-oil ratio of 672 cubic feet per barrel and a total gas-oil ratio of 1,220 cubic feet per barrel. The plunger made 286 strokes per day picking up about one-third of a barrel per stroke, and with a casing pressure of 52 pounds per square inch.

Figure 1

HUGHES PLUNGER LIFT ON NO. 26 RAY, PETTUS

Date installed	10–18–32
Production, bbls./day	160
Number of strokes per day	154
Barrels of fluid picked up per stroke	1.040
Casing pressure, lbs./sq. in.	109
Tubing pressure — maximum — lbs./sq. in.	74
Tubing pressure — minimum — lbs./sq. in.	8
Depth of well, feet	3,948
Depth of footpiece, feet	3,934

Date of above data was January 24, 1933.

The second installation was made March 27, 1932, in No. 15 Ray, which had produced on gas lift 47 bbls. per day with 3,800 cubic feet of input gas per barrel. Plunger lift tubing was set at 3,892 feet and the unit produced 94 bbls. of oil per day with 940 cubic feet of input gas per barrel, making 234 strokes daily, picking up about four-tenths of a barrel of oil per stroke, with a casing pressure of 53 pounds per square inch.

The satisfactory performance of these units resulted in additional installations as fast as wells were ready, until at the present time there are 15 plunger lifts in operation on this lease, and lifting costs represent actual plunger lift performance.

The fundamental advantage of this new pumping method lies in the decreased maintenance expense resulting from mechanical simplicity and from the elimination of close fits and high working stresses usually encountered in equipment for pumping deep wells. The plunger lift is not a gas lift in the commonly accepted sense, but has quite different characteristics, even though lifting is accomplished with gas. To note two of these differences in plunger lift operation, lifting pressure is independent of height of lift, and lifting is accomplished by displacement of the load of oil at substantially constant pressure; whereas in the gas lift, lifting pressure is a function of height of lift, and it is the expansion of the gas which provides the energy for lifting. On the other hand the plunger lift is admirably suited to supplement gas lift, which latter is better adapted to the production of large amounts of fluid where pumping levels are high and sufficient submergence is therefore available; as fluid levels drop and production decreases to a point where gas lift operation is relatively unsatisfactory, production can then be continued with the plunger lift to the point of abandonment, thus utilizing the investment in compressor stations and lines, and at a maintenance expense no higher than required for gas lift operations.

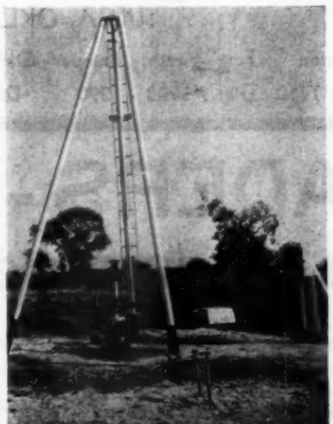


Figure 2

HUGHES PLUNGER LIFT ON NO. 18 RAY, PETTUS

Date installed	6–29–32
Production, bbls./day	45
Number of strokes per day	314
Barrel of fluid picked up per stroke	0.144
Casing pressure, lbs./sq. in.	25
Tubing pressure — maximum — lbs./sq. in.	15
Tubing pressure — minimum — lbs./sq. in.	0
Depth of well, feet	3,927
Depth of footpiece, feet	3,918

Date of above data was August 29, 1932.

That this claim is substantiated by performance is evident from the fact that there have been only six tubing jobs on the lease in a year's time for reasons as noted, exclusive of original installation. Maintenance costs have averaged below 3 cents a barrel, a figure not far from the cost of handling flowing production. Input gas required has amounted to about 450 cubic feet per barrel, average, at a maximum pressure of about 150 pounds per square inch. The power cost is then the cost of circulating this gas with compressors, which is obviously a low figure. It is apparent, however, that the marked reduction in lifting costs as compared with beam operation in the same district is due mainly to the sharp reduction of maintenance expense.

Figure 3 shows the location of plunger lift units on the lease, together with average production figures for the seven days from November 17 to 23, 1932.

It is significant that the production from plunger lift units is nearly double that of offset wells equipped with standard rigs; while there is obviously a pressure on the casing of plunger lift wells, it is also reasonably certain that bottom hole pressure is lower in this district than that which can be maintained with rods, as there seems to be no other reasonable explanation of the greater production realized with the lifts. There is one exception, in that Houston Oil Co.'s No. 1 on the beam is producing more than the offset plunger lift unit; the former flowed for some time after it was necessary to put No. 20 Ray on gas lift, and was only standardized after the installation of a plunger lift unit on No. 20 Ray. It is, therefore, reasonable to believe that better drainage channels to this well exist and that as a consequence the fluid level is higher.

Operations at Pettus over the past year have demonstrated the applicability of the plunger lift system to the economical

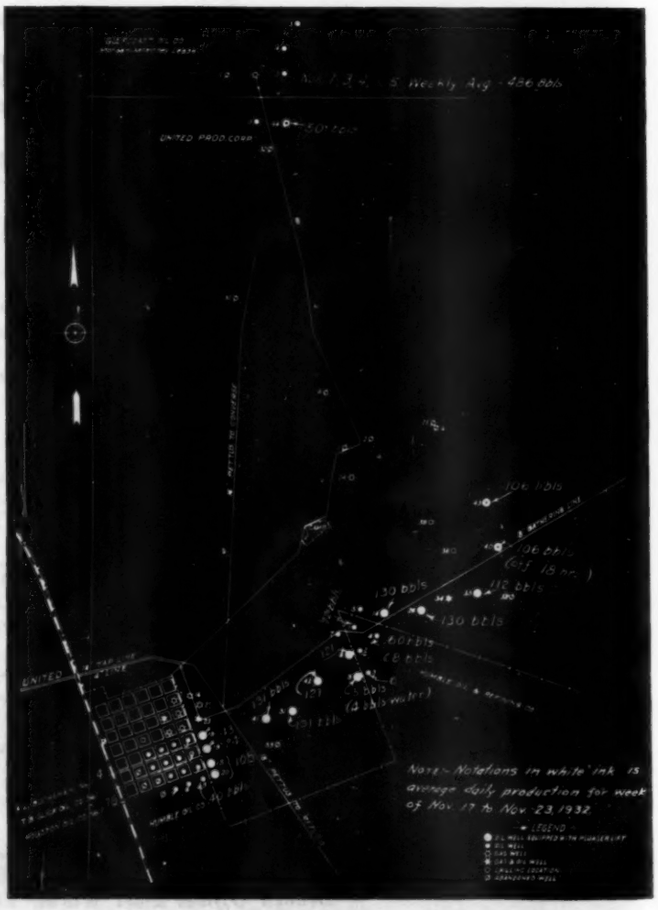


Figure 3

Quality Cups by Cup Specialists

C. L. & W. W. Auer, succeeding C. A. Auer manufacturer of Hydraulic Leather since 1882 and Packings since 1910, contribute a specialized knowledge obtained from actual tannery experience in selecting choice leather for Auer products and skilled practical and technical knowledge in working up this leather to meet the oil industry's most exacting requirements.

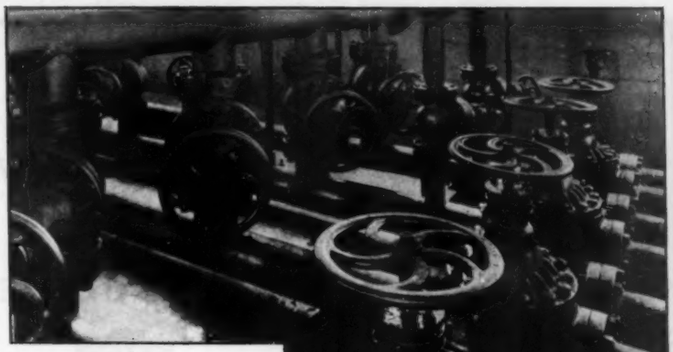
Close to a million pieces are produced annually. Standard with many large Eastern producers, "Seep" and "Star" Leather Cups set the mark for quality.

"SEEP" LEATHER VALVE AND PUMP CUPS. Made from highest grade, slow-tanned, long but tight fiber Scoured Oak Leather. Cut from the choicest part of the hide, each cup combines hardness with pliability—long life with absolute conformity to the working barrel. Skilled operators center, turn and dress each cup by hand.

"STAR" LEATHER VALVE AND PUMP CUPS. Made from good grade, long-fiber Oak Leather. Somewhat softer than the "Seep" cup, consequently, lower in price, but of the same high grade workmanship.

Ask Your Supply Store for "Seep" and "Star" Quality Leather Cups!

C. L. & W. W. AUER, Corry, Pa.



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This Texas pipe line station is all Ludlow because experience has proved the dependable quality of Ludlow Double Gate Valves.

Standard 1600-lb. test Double Gate Ludlow Valves are availabe in standard sizes up to 12″ in all-iron or bronze-mounted types.

Ludlow, original inventors of Double Gate Valves, have a wealth of experience which has gone into the development of the present modern and complete line, particularly designed to meet the rigid requirements of oil and gas field and refining services.

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TRADE LUDLOW MARK

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Wedge Thread Protector with Drain Holes, (Illustrated Above)—All the advantages of the standard protector with the exclusive WEDGE drain holes—meets A.P.I. specifications. Available for 2″ to 6″ pipe.

Wedge Tin Plugs—To protect holes, tapped or plain and all female threads. Pressure of thumb locks in place . . . plug holds with *bull-dog* grip . . . Sizes to meet any requirements.

Wedge Paper-Lined Thread Protector—Paper lining forms cushion of protection . . . easily forced on by hand . . . must be screwed off . . . does not mar thread of softest metal. Sizes for ½″ to 3″ pipe.

Wedge Standard and Pipe Line Thread Protectors—Quickly screwed on or off by hand . . . exclusive WEDGE locking feature, prevents rattling off in transit . . . large center opening . . . husky steel construction . . . cost less than other protectors . . . available for 2″ to 6″ pipe.

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The WEDGE Split Chill Ring especially designed for Electric Welding—If you have tried Chill Rings for electric welding and have been disappointed, we urge that you try the "WEDGE". You will achieve results which you believed impossible. We designed and built the "WEDGE" chill ring for electric welding to meet the most rigid requirements of electrical engineers. Sturdy construction prevents "burning through." Less resistance to flow is offered because of snug fit, smooth inside surface, and positive elimination of "icicles."

Besides standard items WEDGE PROTECTORS make anything cap or cup shaped to suit individual needs. Ask for quotations and samples.

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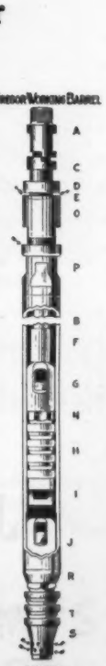
McGregor Working Barrel Co., Inc.

106-108 Elm St.—Bradford, Pa.

Oil Producers and Leasemen!

The New Mac Plunger Working Barrel!

The plunger is the same length as the diaphragm and it works in and out at both ends into the fluid and washes the sand off and greases the plunger the length of the stroke of the well. This will prevent sticking and will not gypsum. The Standing Valve is 2 feet below the Plunger Barrel and is cast in a malleable collar. The holes or tubes in the collar for the fluid goes into the body of the standing valve into 2-inch pipe below the plunger. This leaves an opening around the outside of the standing valve so that any sand or settlement can settle down past it into the anchor acting as a standing valve and sand trap both. The anchor must be plugged and just as tight as the tubing above the plunger. When the standing valve is worn out and with the Seat "M" above by pulling the plunger and dropping a drop valve which seats on the Seat "M" two standing valves will be worn out while the plunger and the diaphragm is wearing out. When all of them are worn out, use the McGregor Working Barrel or the McGregor Plunger Barrel and seat on top of the diaphragm.



We guarantee them to be as good or better than any plunger Working Barrel on the market.

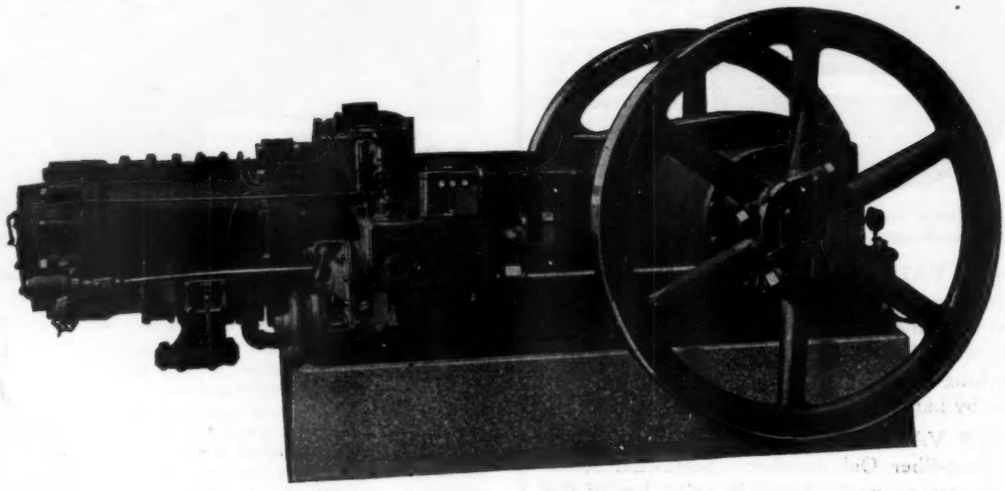
Bradford, Pa., May 9, 1933.
McGregor Working Barrel Company,
Bradford, Pa.

Dear Sir: On Dec. 29, 1932 we installed one of your new improved working barrels on our state line lease well No. 4FH-4. Since we installed this barrel it has run 24 hours per day since the above date and has given perfect service.

Yours very truly,
Petroleum Reclamation Company,
D. W. Weaver, Purchasing Agent.

Patented

REID offers two great Gas Engines for central power loads in East Texas



Type C 2-Cycle

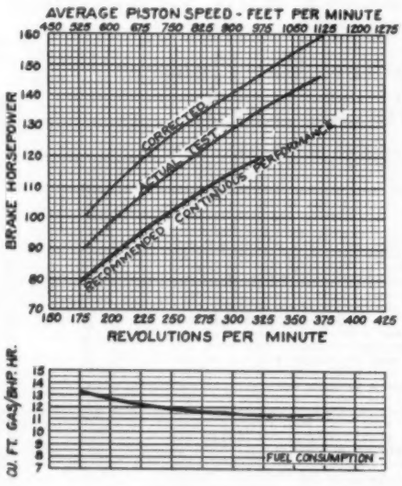
14½" x 18" 110 H. P. at 180 R. P. M.

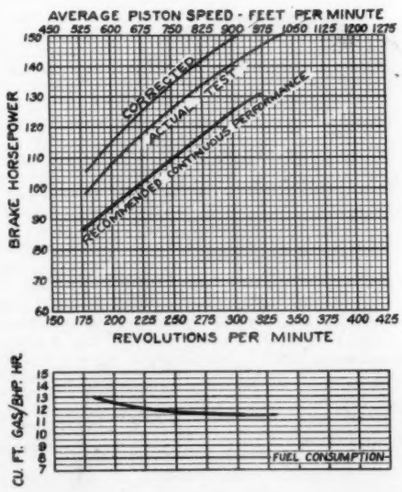
and

15" x 18" 120 H. P. at 300 R. P. M.

These Engines are built with a ruggedness and simplicity that guarantees economy of operation and assures a long and useful life.

We invite the most critical examination of these units before you make your final decision on East Texas power requirements.


AVERAGE PISTON SPEED - FEET PER MINUTE
450 525 600 675 750 825 900 975 1050 1125 1200 1275
BRAKE HORSEPOWER
160 150 140 130 120 110 100 90 80 70
CORRECTED
ACTUAL TEST
RECOMMENDED CONTINUOUS PERFORMANCE
150 175 200 225 250 275 300 325 350 375 400 425
REVOLUTIONS PER MINUTE
CU. FT. GAS/BHP. HR.
FUEL CONSUMPTION


AVERAGE PISTON SPEED - FEET PER MINUTE
450 525 600 675 750 825 900 975 1050 1125 1200 1275
BRAKE HORSEPOWER
150 140 130 120 110 100 90 80 70 65
CORRECTED
ACTUAL TEST
RECOMMENDED CONTINUOUS PERFORMANCE
150 175 200 225 250 275 300 325 350 375 400 425
REVOLUTIONS PER MINUTE
CU. FT. GAS/BHP. HR.
FUEL CONSUMPTION

Joseph Reid Gas Engine Company

Oil City, Pennsylvania
U. S. A.

Frick-Reid Supply Corp.
Pittsburgh and Tulsa

R. B. Moore
Bolivar, N. Y.

lifting of oil from deep wells; low lifting costs in pumping wells, as a result of reduced maintenance, are an accomplished fact on a commercial scale. The success of this undertaking is due in large measure to the active assistance and co-operation of B. M. Nowery, general superintendent of the United Production Corp.; Cliff McDowell, district manager, and Tom McDowell, production superintendent at Pettus. The satisfactory results obtained have justified their faith in the commercial applicability of this new pumping method.

Reciprocating Pump Unit Installed on End of Tubing

The Reda duplex reciprocating pumping equipment is a new development by the Reda Pump Co., Bartlesville, Okla., and was designed primarily to handle small volumes of fluid from oil wells of any depth, furnishing a small, compact unit which is installed on the bottom of the tubing. This equipment is furnished in two sizes, the 500 series for wells with casing of 6-inch diameter or larger, and the 700 series for wells with 8-inch casing or larger. The 500 series weighs less than 600 pounds, and the 700 series less than 1,200 pounds.

The only surface equipment required, in addition to a derrick or some other means of running and pulling the tubing, is a steel reel for spooling the electric cable when the unit is removed from the well, an electrical switch and the well connections as shown in the picture of an installation in the East Texas Field.

A submerged electric reciprocating type pump installed on East Texas well

The complete unit consisted of a Reda motor, duplex power head, duplex pump head with liners, plungers and valves; a three-conductor transmission cable and reel; cable clamps and a control switch.

Motors for the 500 series range from 5 to 10 horsepower, and the 700 series from 5 to 30 horsepower. The duplex power head provides two gear reductions; one of 24 to 1 for 150 strokes per minute, and 18 to 1 for 200 strokes per minute. The 500 series has a 3-inch stroke; the 700 series a 4-inch stroke. The power heads are so designed and constructed that the gears have ample factors of safety and bearing loads are not excessive.

The pump head for the 500 series will accommodate 1-inch to 1¾-inch working barrels, and the 700 series from 1-inch to 2¾-inch working barrels. The liners and plungers are of ground and hardened nitralloy material closely fitted and so designed that no sand trap is formed between cages and liner; also, the small undisplaced area between the suction and discharge valves and the consequent high compression ratio eliminate any danger from gas locking in handling of gaseous fluids.

Capacities

The 500 series unit with the various plunger sizes is capable of handling 100 bbls. per day from 6,500 feet up to 320 bbls. per day from 2,500 feet at 150 strokes per minute; at 200 strokes per minute the same unit will handle 140 bbls. per day from 6,000 feet or 430 bbls. from 2,000 feet. The 700 series, at 150 strokes per minute, will handle 218 bbls. per day from 7,500 feet or 1,050 bbls. per day from 1,500 feet. The same series, at 200 strokes per minute, will handle 290 bbls. per day from 7,500 feet or 1,410 bbls. per day from 1,500 feet.

The approximate efficiency of the units are as follows: Electric—75 per cent to 85 per cent, according to load and depth. Mechanical—70 per cent to 80 per cent, according to load. Volumetric, up to 100 per cent, according to gas and submergence; and overall efficiency, of from 40 per cent to 70 per cent. The figures given on heads and capacities are all based on water and may be greatly exceeded when pumping oil only.

The recommended tubing sizes are 1¼ inches to 1½ inches for the 500 series and 1½ inches to 2 inches for the 700 series; however, larger tubing may be used without any material difference except more weight to handle in pulling and running the tubing.

Performance Data

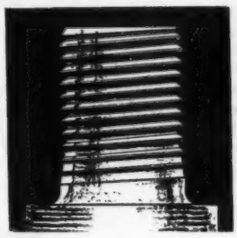
Below is the data on a 43-day run of a 500 series unit in an East Texas well,

NU-ALLOY
DROPS & SEATS
outwear from three to ten sets of balls and seats . . . and will operate in any standard crown.
PETROLEUM EQUIPMENT CO.
NU-ALLOY BALLS & SEATS
FORT WORTH, TEXAS

Compare the Physicals and the Quality of

AXELSON

STANDARD NO. 55 SUCKER RODS



before you decide to buy

Axelson Standard No. 55 Sucker Rods are engineered to sell at prices which meet present conditions. The quality of the rod material represents a selection of steel based on 40 years' experience. This factor, combined with the manufacturing background of the Axelson organization, results in a sucker rod which properly meets pumping requirements. For certain special conditions Axelson also manufactures the Axelson Amco No. 60 Sucker Rod. Every Axelson Pump is built to meet the yardstick of maximum service. Regardless of the type or combination selected, their service spells steady production, infrequent pulling jobs, maximum production.

Axelson Pumps are made in over 50 types and combinations to fit every oil well condition.

Axelson Sucker Rods are made in 3 kinds—all built to standard requisites.

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AXELSON PUMPS AND SUCKER RODS

NOW—

that you are spending a lot of money equipping your wells for pumping, your next consideration should be the most efficient operation of the pumping equipment.

Lowest operating costs are realized when your wells are pumping at the proper speed, length of stroke and with the correct amount of counter-balance.

It is possible to obtain these conditions only by periodically weighing your wells with a Martin-Decker Pump Dynamometer or Pull Rod Dynamometer.

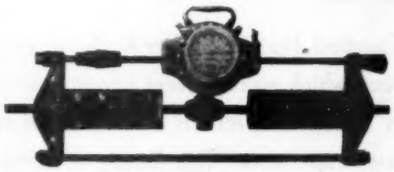
Write for a booklet!

Martin-Decker Corp.

Box 299

Long Beach California

The M-D Pump Dynamometer for weighing wells pumped with a walking beam.



The M-D Pull Rod Dynamometer for weighing wells pumped from central powers.

ALTEN'S BEAM HANGER

Alten's Beam Hanger is of rugged design to be mounted on a standard rig walking beam. This Hanger is designed to give a straight lift pumping stroke, which will eliminate the greater part of wear on Polish Rod and Stuffing Box. It can be swung back out of place for pulling rods or tubing. Comes equipped with Polished Rod Clamp. Can be furnished for wood or steel beam.

Triple Duty Casing Head

Alten's Triple Duty Casing Head can be used as a Tubing Hanger for pumping, Tubing Spider for pulling tubing and for cleaning out. Special attachments are furnished for the Tubing Spider and for cleaning out.

An Inquiry to Our Office Will Bring Further Information.

ALTEN'S FOUNDRY & MACHINE WORKS

LANCASTER, OHIO

ESTABLISHED IN 1889

near the town of Overton on the extreme east side of the field. The well capacity was estimated at 75 bbls. per day; however, on account of proration, this well has only produced from 38 to 42 bbls. per day. The unit was installed at 3,560 feet on 2½-inch tubing, average head pumped against estimated at about 3,000 feet. This unit is equipped with 1½-inch liners and plungers:

Hours run per day, 5 to 6.
Barrels per day, 38 to 42.
K.W.H. consumed per day, 21 to 25.
K.W.H. demand, 4.
K.W.H. barrel, .55.
Barrel cost at 1-cent K.W.H. rate, .0055.

New Application of Stage Lift Principle to Oil Wells

Operating under patents of Jeddy Nixon, the W-K-M Co., Inc., Houston, Tex., has developed an entirely new application of compressed air or gas for raising fluid in wells. The results obtained during actual field operation have demonstrated that this method is remarkably economical and the equipment itself apparently will give almost indefinite service.

The main features of the system are to use the well casing as a reservoir in which to keep at all times the compressed air or gas ready for instant use. At no time, however, is any back pressure applied against the well itself, as a packer is used in the fluid where the collecting chamber is suspended at the end of the tubing.

In actual operation when the incoming fluid has filled the collection chamber the air valve is automatically opened by a float, and all of the fluid in the chamber is expelled in one load through a well tubing, and into the collecting tank on the lease. The tank may be at almost any distance from the well, a quarter of a mile or more for instance, and no additional effort is required to handle the fluid, which is moved in one load from the collection chamber to the flow tank.

Between the discharges the well tubing is empty and entirely free from pressure; therefore, the hydrostatic pressure on the well itself is greatly reduced so that the well actually produces more freely because of the removal of the fluid pressure in the tubing.

Because of the raising of a limited volume of fluid at a time, instead of trying to move an entire column, the air or gas pressure required is less but the most important thing is that the amount of air or gas used is said to be unprecedentedly low. As a result, the cost of raising fluid is greatly reduced.

Operating expenses are reduced to a minimum and all the equipment used in one well may be taken out and put into another well in one day at small expense. The wearing parts submerged in the fluid are made of stainless steel, and should give long service. The ordinary well tubing is used, and the manufacturer claims more fluid can be produced through the same size tubing.

The system is said to have no objectionable features, and is free from likelihood of annoyances, with the lowest possible operating costs per barrel of fluid raised.

Oil Wells Produced by Siphon Lift and Venturi Tube

The problem of lifting oil economically from both deep and shallow wells has been attacked from a rather new angle and apparently quite successfully through the use of the principles of the siphon and the venturi throat by the Mission Manufacturing Co. in its Mission-Haywood siphon lift. This method has been thoroughly tested by more than 200 installations in water and oil wells of varying depths, under a broad range of conditions, and has apparently met with almost uniform success.

The principle involved is the use of a jet to draw the fluid from the bottom of the well and force it through a series of venturi throats which converts potential energy in compressed air or gas into kinetic energy of a high velocity column of gas and fluid, which in turn raises the fluid to the surface of the ground. The overall efficiency of this system has proven itself to be in the neighborhood of 60 per cent, which is considered highly efficient by the manufacturers.

More specifically, siphon lift consists of a section of tubing about 2 feet long into which an air or gas line is led from the outside, this line ending in a nozzle turned upwardly in the tubing. Above the nozzle is a series of venturi throats placed in line with the nozzle. The device described is placed in the tubing string at the desired depth with tubing running from the lower end of the tool to the bottom of the well to act as a suction pipe. The air line from this tool does not go to the top of the well but runs upwardly along the side of the tubing, to which it is strapped, to a point above the fluid level, and ends there in a perforated nipple.

By this manner of installation, the pressure in the annular space of the well, either built up by the well itself or by outside means, is exerted downwardly on the fluid in the casing, thus creating an artificial submergence for the tool, while at the same time gas is passing through the external air line to the tool and raising the fluid to the surface. By this means, all energy created by the well itself is used to help lift the fluid to the surface and only such energy need be added as is lacking in the well.

Due to the fact that the siphon lift is a constant flow tool, bringing the fluid to the surface in a steady stream of gas and fluid, and thus eliminating the heads usually encountered with air or gas lifts, there is no pounding action on the sand; on the contrary, due to the steady suction developed in the device, the flow through the sand is always in one direction and has a tendency to keep the formation clean and loose.

The experience with this type of lift in salt water wells has been extremely gratifying both because of the large volume of fluid that can be handled and because the pressure held constantly on the fluid has a tendency to hold back the water. In some cases it has been found that by periodically flowing wells containing a large percentage of salt water the percentage of oil has been greatly increased, and in one case pure pipe line oil was produced. It appears, in such cases, that the water has a tendency to settle out of the oil during shut-in periods thus allowing the oil to be produced nearly free of water during the flowing period. By producing salt water wells under this system a considerable proportion of the problem of handling the water may be eliminated.

Gas-Oil Ratio Reduced

The amount of gas necessary to produce a barrel of oil by this method seems to be extremely low as compared with other established methods. In the Oklahoma City Field, in four wells which were previously produced by blowing through the tubing and flowing through the casing, the gas-oil ratio was reduced from approximately 4,000 feet per barrel to approximately 500 feet per barrel upon installing the siphon lift. In some cases, in other fields, the oil has been lifted with as little as 175 feet per barrel and in no case reported has gas exceeded 1,000 feet per barrel of oil produced. The efficiency of a tool of this type, of course, depends on having approximately the correct size of tubing for the volume of oil produced. Extremely low capacity wells should have tubing as small as 1¼ inches while the average wells may use 2 or 2½-inch tubing successfully.

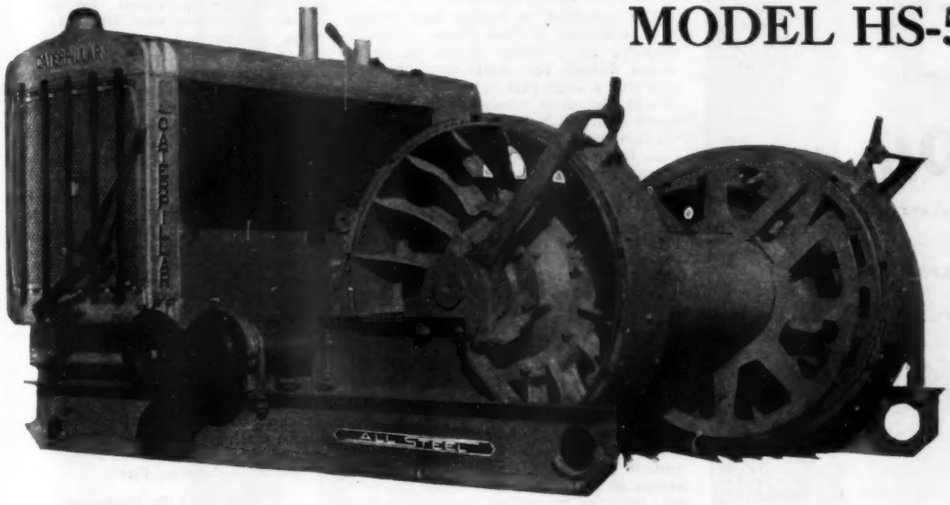
Flowing Pressures

The flowing pressures of wells equipped with this type of lift are comparatively low, the average running between 150 and 300 pounds. The flowing pressures

Well-servicing Equipment for Oilwells of any depth

Skid-type or tractor-type to afford every degree of portability necessary to meet any condition—gas, gasoline, electric or Diesel power—wide selection as to make of engine—Horsepower ranging from 32.5 to 97. Prices $1250.00 up.

MODEL HS-5500 SKID UNIT



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These highly portable skid-type units are supplied with "Caterpillar" and "Waukesha" engines of power suitable for all East Texas wells at $2100.00 f.o.b. factory. Units in various sizes but of identical design are available for both shallower and deeper fields. Drums are full floating type mounted on Timken bearings. Bearings run in constant oil bath. Alloy iron brake flanges, guaranteed to not check, crack nor become distorted. Brakes are of our exclusive Wedge-action Design. Everything contributing to Speed, Safety, Durability and Economy has been included in our design.

MODEL HB-35 FOR "CATERPILLAR" MOUNTING for "THIRTYFIVE", "FIFTY", "SEVENTY" Tractors

CARDWELL ALLSTEEL Tractor Mounted Winches are identical, in mechanical design, with the Skid-type Units. Model HB-35 is particularly adapted to East Texas production. Price $1900.00 f.o.b. factory. These units are so designed that the Tractor upon which they are mounted is at all times available for all ordinary draw bar purposes and may be employed in moving rigs and heavy equipment, or in road construction and maintenance when not being used for well-servicing. No part of the Winch mechanism is in motion when the Tractor is being used for tractive purposes.

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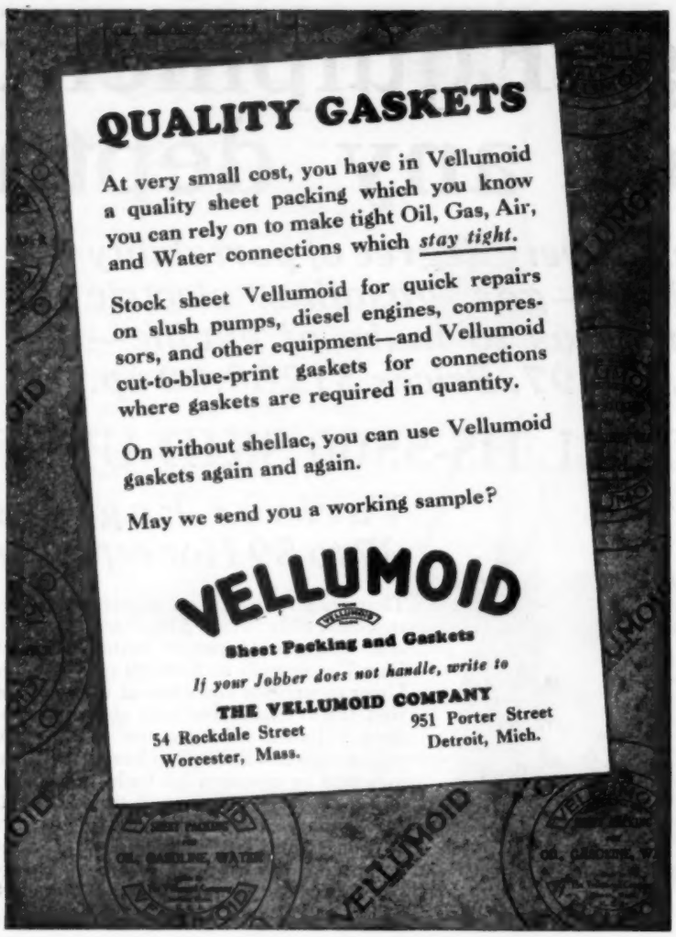
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The KEY to LOWER LIFTING COSTS
CORRECTLY DESIGNED ECONOMICALLY PRODUCED
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We are now able to offer you our latest and best effort along this line—the B-M-W MONARCH BALL & SEAT.
The Monarch Ball & Seat is extremely non-corrosive and at the same time very much harder than other non-corrosive Balls & Seats.
Resists cutting action of sand and eliminates difficulties from ball breakage. Highly recommended for severe service.
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depend more on the amount of fluid produced than upon the depth of submergence, although, of course, the fluid handled will as a rule increase in proportion to the submergence. The flowing pressures in the 6,500-foot Oklahoma City wells ranged around 250 pounds, producing from 400 to 600 bbls. of oil. The fact that the gas pressure in the tool does not depend so much on the submergence as on the volume of fluid handled, and is exerted only on the inside of the lift, no back pressure is placed on the sand, in fact it lowers the back pressure on the sand materially.

The practical application of the type of lift manufactured by the Mission Manufacturing Co. seems to offer extremely interesting possibilities in the line of solving many of the perplexing problems now facing the production departments of the oil industry in these times of enforced economy in the lifting of oil.

Bottom Hole Choke Principle Applied to New Gas Lift

To cover the experiences with a removable bottom hole choke and the development of a new system of gas-air lift specially suited to East Texas wells, H. C. Otis, president, Southern States Co., Inc., Shreveport, La., has written this brief description:

Bottom Hole Choke and Air Lift

The operation of bottom hole chokes in a field such as East Texas is one of dropping the pressure of the oil as it passes through the chokes to a pressure at which a large part of the gas in solution in the oil is released. It is this released gas which raises the oil, making the flow more or less of a gas lift proposition. In tests conducted early in the life of the field, it was found that, with a bottom hole choke having a capacity of 17 bbls. per hour set at 3,500 feet in 2½-inch tubing, operating against 20 pounds surface pressure and with 1,400 pounds bottom hole working pressure against the lower side of the choke, the pressure on top of the choke was only 350 pounds.

At this pressure of 350 pounds a large portion of the approximately 350 feet of gas dissolved in each barrel of oil is released. When, however, rate of flow is decreased to less than approximately 100 bbls. daily, the quantity of gas released is not sufficient to maintain flow even when flow is against very low trap or surface pressures. Delivery pressures in excess of 25 pounds so decrease the volume occupied by released gas that unless the volume of oil being handled is considerably in excess of 100 bbls. daily, flow velocities are so low as to result in slippage and consequent loading of the flow line.

Bottom Hole Pressure Drop

Several bottom hole chokes were installed and in successful operation along both the east and west edges prior to the time that the allowables were reduced to less than 100 bbls. As, however, allowables were rapidly reduced downward below this point, it became obvious that straight bottom hole choking was of no value so far as prolonging flowing life of the wells was concerned.

It was obvious, however, that if when flowing through a bottom hole choke at the above rate of 17 bbls. per hour, the pressure on top of the choke is only 350 pounds, by far the greater part of the space within the tubing during flow must be occupied by gas, and that only a comparatively small amount of this space would be occupied by oil. It was assumed then that if flow could be cut off at the choke, or if the choke could be converted into a bottom hole valve, that the quantity of fluid left in the tubing would be comparatively small, and that consequently when flow through the choke was again permitted the incoming oil would have only a comparatively light load to "buck."

A removable bottom hole choke was converted into a bottom hole valve with an effective opening which would permit flow at the rate of 17 bbls. hourly by threading a small vertical check valve into the choke mandrell. Lowering a 30-pound weight normally left suspended in the well on a Halliburton line against this check valve caused it to open to permit flow, while raising the weight from the valve allowed well pressure to close it.

The equipment was installed experimentally in an east edge well which, during the five months since its completion had always had to be swabbed before flow would start. It was found that after flow had been closed in on bottom, well would head at intervals for 45 minutes, and would clean itself almost down to the choke, so that when the valve was opened to run the next day's allowable the well had no difficulty in "kicking off." Surface delivery pressure in this trial was less than 10 pounds.

After about three months successful operation, the equipment was installed in two other east edge wells. In these wells, due to long small diameter flow lines, the tubing head pressure when flowing at the rate of 17 bbls. hourly ranged between 50 and 60 pounds. This meant a pressure during flow above the choke valve of about 650 pounds, or such a pressure that no considerable volume of gas was released from solution until the fluid had traveled about half of the way to the surface. This meant that during flow a relatively large instead of small amount of the space within the tubing was occupied by oil, so that when flow was closed off on bottom by raising the weight a few feet a comparatively large volume of fluid was left in the tubing to retard kicking off when the valve was opened the next day. Under these conditions of high tubing head delivery, bottom hole stopcocking—for that is what it amounts to—is not successful simply because the pressure immediately above the choke is not dropped low enough to release much gas, resulting in large rather than small quantities of oil being present in the tubing during flow.

Flowing Life Prolonged

This method of prolonging flowing life where flow lines and trap pressures are less than 20 pounds, is so cheap and can be installed on such short notice that several companies are planning its use as a temporary means of securing the daily allowable while waiting for more permanent equipment to be installed. These companies are considering carrying a small stock of these chokes with the bottom hole valve attachments. If a well unexpectedly goes dead, two men can install the equipment in a matter of only a few hours, and the well made to kick itself off and run its allowable while waiting for more permanent lifting equipment to be installed. It is not known at how low a bottom hole pressure this method of bottom hole stopcocking will operate, but it is reasonably safe to presume that it will cover several months at least in the well's life.

New Device Designed

Realizing that as bottom hole pressure declined sooner or later a pressure will be reached when operating with a bot-

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are now available in a new alloy 100% RESISTANT TO SULPHUR WATER AND GAS
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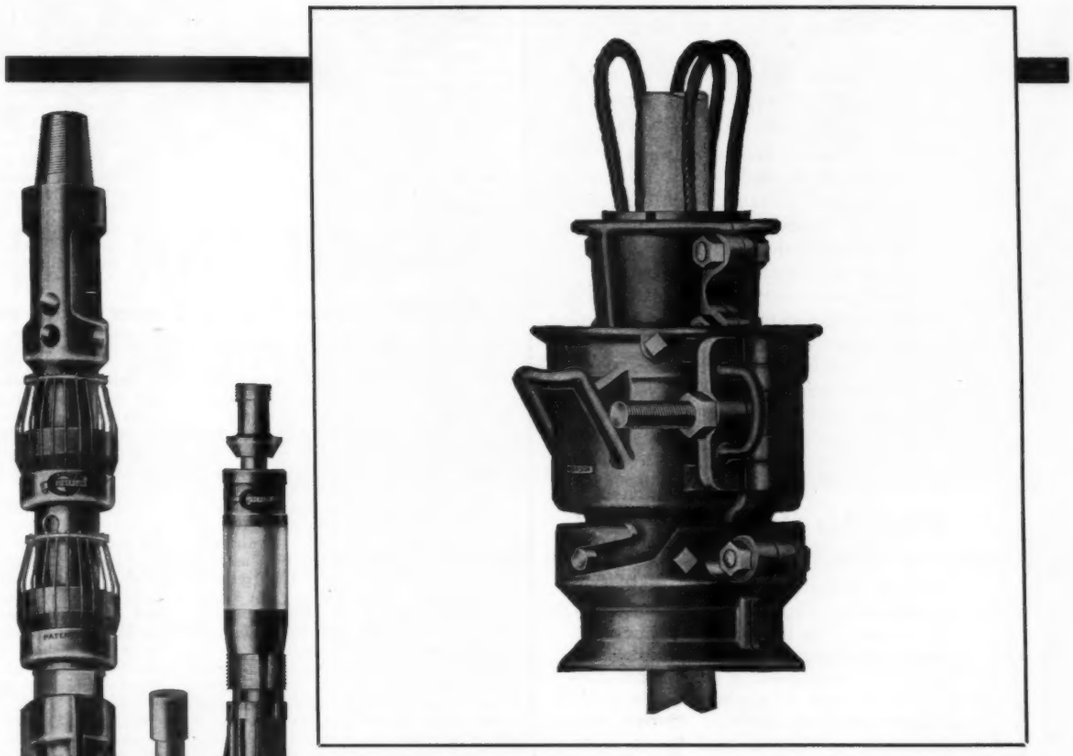

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To prevent gas and oil from leaking by, when tubing is being run or pulled—and for real *speed* of action—the automatic GUIBERSON Tubing Stripper has no competition. It forms an absolute seal between tubing and casing. Pulling crews want it, for it keeps poison gas, oil and slush off the men. Made in two halves permanently hinged at back and with strong screw latch at front.

The GUIBERSON Packer is unequalled for forming a tight, dependable pack, at any depth, between tubing and casing, and confining the flow to the tubing. The GUIBERSON Tubing Catcher, inserted as a short section of tubing near bottom of string, automatically stops the tubing from falling and causing a tedious fishing job or even abandonment of the well. The GUIBERSON Swab is superior to all other swabs for any swabbing job.

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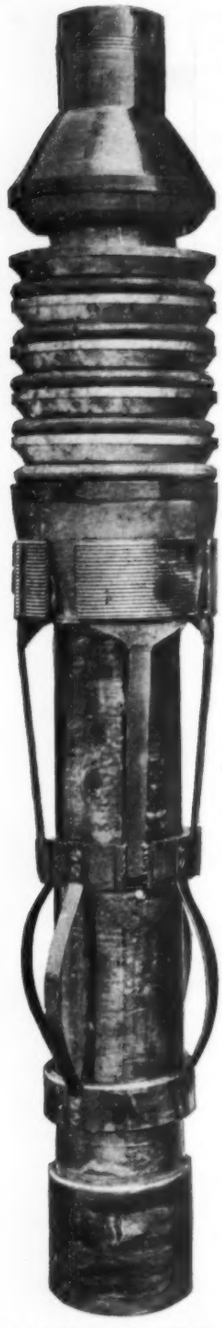
GAS PRESSURE LOW?



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Here's a packer which cannot stick or vulcanize to the casing, and makes possible these uses you never dared try before....

- flow wells having low gas pressures
- bring in wells by swabbing
- locate and hold off water leaks in the casing
- reduce the pump load, and
- permit pumping thru packer
- suspend the liner at any desired point
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- by-pass compressor gas below the packer
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- pack off fluid pressures to 5,000 lbs. per square inch
- and many other safe and saving uses.

Why this "RING TYPE" Packer is Better

Always under complete control—Can be set and re-set many times—Graphite treated fabric over a rubber core produces rings which cannot vulcanize to casing—Can be run on tubing, drill pipe or casing—Seals positively with well distributed pressure on casing—Releases easily even after being set for several years.

Above, an unretouched photograph of rings which have made two round trips to a depth of 3,600 feet. Note the perfect condition after being set 11 times the first run, and 9 times the second run without coming out of the hole, which was filled with heavy rotary mud.

To left, an unretouched photograph of the 16" Lane-Wells Packer which supported a load of 424,798 pounds, absolutely sealed-off, and released readily without damage to casing or packer.

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If your Supply Store does not yet stock this amazing packer, write us for illustrated folder containing complete specifications, prices and list of uses which mean Safety, Convenience and Profit to you.

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tom hole valve could not be done because the well would not have sufficient energy to kick itself off, the obvious remedy in such a condition would be to pump air or gas into the flow string immediately above the valve to assist in the starting of flow, and to continue this introduction of air or gas for a short time after closing off the flow of oil through the choke. This flow of air or gas continuing after the flow of oil had been cut off on the bottom would insure the emptying of virtually all of the fluid above the valve, so that flow the next day could be started in practically a dry string. This, of course, would eliminate any high kickoff pressures.

A removable bottom hole choke or valve to be set in a special nipple which carried an air inlet orifice has been designed. The valve incorporated in the choke was to be opened and closed by means of a weight suspended in the tubing on a Halliburton line. Before this valve had been built, however, it was found that the valve could be opened and closed by the energy being introduced into the well in the form of compressed air or gas, thus doing away entirely with the necessity of suspending a weight in the tubing and making the operation of the valve automatic.

When the air pressure is turned on the valve at the bottom of the tubing would open to admit fluid into the tubing, this fluid to be raised by the air or gas being introduced into the tubing immediately above the valve.

When the air pressure is turned off the valve on bottom would close preventing the entrance of any more fluid into the tubing until the air or gas pressure is again turned on. Since the volume within the tubing occupied by oil during flow will be relatively small, only a small amount of fluid will be in the tubing when flow is to be resumed. Kickoff pressure will consequently be low instead of high—will be lower rather than higher than flowing pressures.

Kick-Off Collars Used to Conserve Gas and Pressure

Various types of kick-off collars, flow collars and similar devices have been used in East Texas wells to permit gas to flow into the tubing at various points below the fluid level existing in the well.

These units work upon the principle of a balanced valve which is open in one direction of flow when the pressure on one side is greater than on the other. By placing these kick-off collars at regular intervals along the tubing the fluid column is in effect cut into several short sections. To start upward movement of the fluid, compressed gas or air is pumped into the well, either through the tubing or into the annular space between tubing and casing and the flow then starts in the other section of flow string.

Kick-off units permit of a form of operation sometimes referred to as "stage lifting," and for East Texas wells that do no flow after being shut in for a time it has been found that by lightening the fluid column the formation pressure is sufficient to keep the well producing for some time.

It is necessary to have available some form of compressor because there is not sufficient formation pressure in East Texas to permit the use of the surplus gas from a high-pressure well in another well that will not flow naturally. In some fields it is only necessary to conduct the gas from a high-pressure well to a dead well or a well needing some additional energy to cause it to flow to use this system.

Wells in East Texas have been made to flow with kick-off pressures as low as 350 pounds. Later it will require somewhat higher pressures to keep these wells flowing and it is anticipated that many wells will be operated by gas lift. Under such a method of operation it will be of advantage to equip the tubing with kick-off or flow collars to use the gas available from natural gasoline plants or individual compressor plants as economically as possible.

With the kick-off couplings it is not necessary to rock the well to start it. Nor is it necessary to build up high pressures in the system. Avoiding those two common practices will effect a saving in operating costs and make for safer operation of equipment.

Application of Pneumatic Cylinders to Pumping

(Continued from Page 68)

size pump, 2½-inch Ardmore inverted insert; stroke approximately 6 feet; three-quarters inch rod and 2½-inch tubing; production of well on beam 15 bbls. oil, 155 bbls. water per day; for tests at high production rates fresh water was pumped into the hole to maintain a constant fluid level.

SUMMARY OF TEST DATA
(Pure Oil Co.'s No. 3 Sina Crow, Cushing Field, Oilton, Okla.)

Test No.	Daily rate of fluid pumped in bbls.	Pneumatic cylinder strokes per min.	Daily vol. of compressor air in thousands of cu. ft.	Pneumatic cyl. pres. in lbs. per sq. in. gauge Intake	Discharge
1	41.5	2.5	70.6	256	65
2	56.0	2.0	71.0	241	73
3	84.9	3.0	86.0	242	72
4	95.0	3.0	86.5	242	71
5	111.0	5.5	114.0	262	63
6	130.0	5.0	110.0	243	70
7	240.0	10.0	177.5	253	71
8	287.0	10.0	187.0	244	73
9	312.0	12.25	232.8	258	69
10	338.2	12.5	244.0	262	72
11	343.2	12.5	233.5	254	68
12	437.0	15.0	258.5	245	74
13	560.0	20.0	304.5	257	72
14	655.0	20.0	329.5	252	72
15	664.0	20.0	324.0	252	69
16	712.0	21.5	338.0	255	58
17	795.0	23.0	327.5	260	63
18	805.0	23.0	297.5	256	55

Another field test of a pneumatic cylinder has been made on the Pure Oil Co.'s Bates well No. 1 in the Sasakwa Field, Oklahoma. About 600 bbls. of water per day were produced from the well with the pump at 4,200 feet. Tests on this installation were made to develop data as to characteristics of cutoff on upstroke and compression on downstroke.

Conclusions

The calculated and actual performance of the pneumatic pumping process as described, points to a new method of pumping practice which permits the operation of wells at speeds commensurate with their productions, reduces stress on sucker rods and wear on subsurface equipment, provides a standard installation of high salvage value with flexibility in both producing capacity and power requirement in pumping wells.

The writer wishes to acknowledge with thanks the suggestions and assistance of C. B. Officer of the Sullivan Machinery Co., Chicago, Ill.; K. A. Covell, production engineer, Pure Oil Co., Chicago; and G. C. Emmons, consulting engineer, Chicago, Ill.

Improved Design Prime Movers for East Texas

(Continued from Page 56)

adjust the number of strokes to the variable conditions at each well. To meet the requirements imposed in pulling tubing

Listen Brother

...IT'S JUST TOO BAD FOR THOSE GUYS OVER THERE

I've been around these Texas fields a lot and when I see anything but a string of Reading Puddled Iron Sucker Rods going into one of these tough holes, I know it's just too bad for the lads on the job—and too bad for the expense sheet.

Take a tip from me, if *you* have to go on the pump, and it looks as though we all would, use Reading Puddled Iron Sucker Rods, and prevent shutdowns.

A FEW SERVICE RECORDS OF READING PUDDLED IRON SUCKER RODS. WRITE US FOR QUOTATIONS ON RODS THAT PERFORM LIKE THIS.

STRING NO. 1
194 days' service, no rod breaks yet—2200 foot well. Rods of other metals broke 37 times in 189 days.

STRING NO. 2
174 days' service and no rod breaks — replaced rods of another metal which had 21 breaks in 140 days.

STRING NO. 3
Seven different sizes or kinds of rods showed 171 breaks in 292 days. Reading Puddled Iron rods had 10 breaks in 430 days.

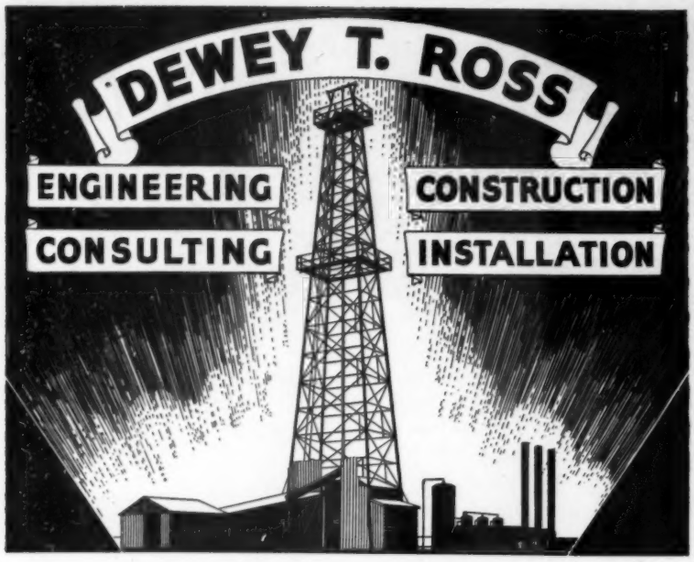
STRING NO. 4
Reading Puddled Iron Sucker Rods at last report had gone 115 days without breaks, or other trouble and were still in service.

STRING NO. 5
In a 4300 footer—10 breaks in 8 months, still in service 4 months later with no more breaks reported.

READING IRON COMPANY, Philadelphia

READING
PUDDLED IRON SUCKER RODS

Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Iron



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and rods during repair operations, however, the motor used in operating the well must be able to adjust itself to great variations in speed and load. The two-speed slip ring induction motor with both speeds variable possesses the necessary characteristics for either service.

Motor manufacturers have designed equipment specially adapted to oil field service and a wide range of types are available for all duties. Auxiliary electric equipment has also been adapted to oil field requirements and in designing all electric equipment special attention has been given to the elimination of any parts that would create sparks and therefore be a hazard in gas laden atmosphere.

Whatever type of prime mover may be required for pumping and servicing East Texas wells the buyer can be assured that specially designed equipment is available. During the past few years when purchasing of new equipment has been at a low level many manufacturers have taken the opportunity to design, build and test new equipment. This improved equipment is now on the market and has been thoroughly tried and proven and it is anticipated that those operators who desire to equip their wells properly will find available to them a wide range of suitable equipment.

To buy cheaply will not be wise for if this field has a normal pumping life the equipment now to be installed will be in operation 5, 10 or 15 years hence. Under such conditions selection of good serviceable apparatus of all kinds and properly installing it is most essential. And under this general recommendation the selection of prime movers is most important. Power costs will go on steadily so long as the oil has to be lifted to the surface and under normal conditions these wells will decline in their rate of daily production. During the later part of their life it is quite probable that much water will have to be handled to secure the oil and lifting water has never been a profitable operation so low lifting costs will be most essential then, and will also play an important part in building up operating reserves to permit the last of the oil to be secured.

Steel Front Walking Beam in East Texas

(Continued from Page 46)

increase as the proportion of water to oil increases.

Bandwheel Units

Where the regular type rig front is to be used the size is usually designated by diameter of bandwheel shaft. Many wells will be equipped with 4½-inch rig irons because they are available from wells in other fields or because they are lower in cost than heavier sets. Such units will probably give good service as long as clean oil and gas is produced. But when water begins to show up in these wells it is almost certain that 6-inch rig irons will be necessary and 40-horsepower prime movers.

If the light rig irons and 25 to 30-horsepower prime movers are installed it is anticipated that after water strikes the well they will be found to be costly to keep in operation for they will be overloaded and shutdowns for repairs will be frequent. Loss of oil during such shutdowns will soon make up for the difference in first cost between the light units and those that should be installed if the whole pumping life of the well is to be considered.

To use old equipment simply because it is available is not always economical.

If the operators in East Texas will be guided by experience in many fields they will not repeat mistakes that have been made in the past and will not consider too closely first costs of equipment. During the early pumping life of the East Texas Field there will be opportunity presented that will permit the operators to pay off on the more costly equipment and this will be a wise investment because it will save shutdowns and added costs for repairs during the later life of these wells when the amount of oil to be recovered has been greatly reduced.

There will be difficulty in convincing operators that they should select equipment for recovering oil upon the basis of from 5 to 15 years' operation. There is ample evidence available, if they will only accept it, that such anticipated long life is justified but selling the idea will be the principal difficulty.

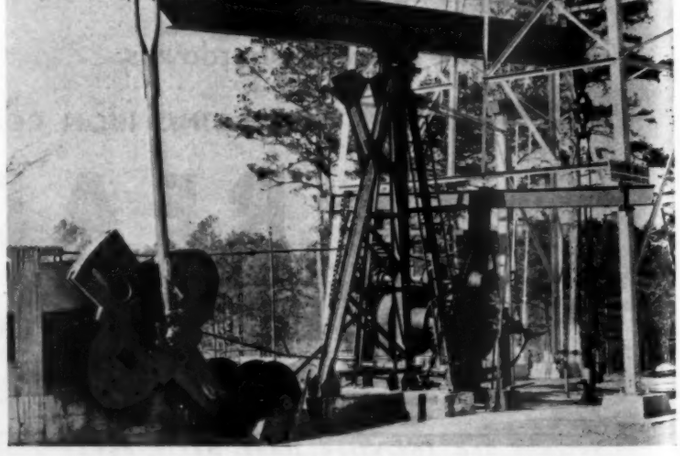
All-steel fronts or self-contained pumping units are recommended for East Texas wells. The power may be steam, oil or gas engine or electric motors but they should be rated at not less than 40 horsepower if all the duties at the well during its entire life are to be performed economically.

Central Powers Will Be Used in East Texas

(Continued from Page 41)

ment in place use portable outfits to swab the wells back on production. Sometimes a whole day is consumed by swabbing before the well will again start to flow, and many of them have not again flowed even after this long swabbing period. Those wells are now ready for mechanical production equipment of some kind.

Many wells will probably be equipped with gas lifts to permit flowing them either for a limited period to start them on production or to produce the daily allowables by the gas lift method. No special trouble has been experienced thus far in operating East Texas wells by gas lift. The Railroad Commission of Texas has allowed a few companies to



East Texas well equipped for pumping

equip their wells for gas or air lift operation by issuing to them special permits. Such permits have been granted only after complete data as to well conditions were submitted to the commission and it is understood they are revocable if the commission at any time deems such methods of producing wells undesirable.

The experience gained in producing Woodbine sand wells in other Texas fields will all come into play in East Texas for it is simply another field of the type of Powell, Corsicana and Wortham except larger in size. Men who have operated in both areas state that good practice that was developed in the older Woodbine sand fields can be used to advantage in East Texas Field.

Shutdowns to Be Avoided

Whatever type of equipment is used to produce East Texas wells when the natural flowing life ceases there is one fundamental principle to be considered. The selection of equipment should be made with the idea in mind that the duty during the later life of the well will be most severe. During that period the daily rate of production will be the least and it will be most essential that the wells be kept in operation the greatest possible number of hours each day.

Shutdowns in this field will mean lost oil. It will not be possible to make up in future production the oil missed during any shutdown period. During the period of life of East Texas after natural flow ceases the oil will be driven to the well largely by water movement. This movement will not only move the oil to the well but it will tend to move it away from the well also. The oil must be recovered as it comes to the well or it will be forever lost. Therefore maximum pumping time will be essential and will be the only way of assuring profits late in the life of this field.

If the wells are shut down to repair parts there will be an added cost to production expense that will be hard to bear because the amount of oil normally recovered will be small. In other words, the percentage of costs to production will be high. It will therefore be good practice to select tried and proven equipment when equipping the well for mechanical production and also to select this equipment with the idea that it is to be used for several years and should be selected to withstand long continuous operation.

Even under the best of conditions there will be considerable wear on pumping equipment in the East Texas Field because it is located in an area where the surface is sandy and this sand will be blown about during windstorms and will not help bearings or moving parts when it gets into them.

Early installation of mechanical production equipment is warranted because if it is available for use at the well in advance of cessation of natural flowing life it can be used to lift the oil to the surface from the bottom of the well and in this way conserve energy that will add to the length of the flowing life of the well.

By conserving the natural energy in this manner it is only reasonable to assume that oil will be delivered to the well over a longer period. It is possible to produce energy for pumping or lifting the oil in surface plants but to reproduce reservoir energy by mechanical means will be costly. It is therefore only good sound practice to conserve reservoir energy for moving the oil to the well and use mechanical energy for lifting the oil to the surface.

The problem for the East Texas operator will therefore be simplified if he will consider it in the light of conserving the present remaining reservoir energy as much as possible, and install his equipment early. When making selection of such equipment it is well to have in mind the fact that having conserved reservoir energy it may be possible to produce these wells over a 5 to 15-year period. Such a long pumping life for wells is not unusual for it has been found that the average life of wells in the United States during recent years is about 21 years.

Fire hazards should be considered in making installations and the least possible amount of wood used around the well. This indicates the use of metal and concrete in construction. For long life this is best and as it also tends to reduce fire hazards it should reduce selection of equipment to but one class material—steel, with foundations of concrete.

Portable Cleanout Unit to Pull Rods and Tubing

Equipment used at wells in the East Texas Field already standardized indicates that many operators will use portable cleanout units to pull rods and tubing and to remove sediment from the bottom of the hole. There are seyeral units of this type upon the market powered by special gasoline motors and some by electric motors. Some units take power from the engine of the truck upon which the winch and other mechanism is mounted.

The Frank's Manufacturing Co. of Tulsa has developed a complete line of heavy and light duty winches mounted upon trucks which seem well suited to East Texas conditions, where several of them are already in service. The Junior model truck motor-driven friction drive winch is mounted upon a 1-ton 6-speed International Harvester Co. truck and is designed for well servicing, cleanout and deepening wells.

These units employ an "A" frame mast for some cleanout work or use the pumping derrick over the well. There is a telescoping boom mounted under the truck body that carries a sheave at the outer end over which the winch line passes before entering the derrick. This line is led from the drum of the winch through the block on the telescoping boom and then over the crown block.

The Frank's Manufacturing Co. builds these units in three sizes, known as the Junior models for servicing wells less than 3,000 feet, the Senior model for wells 3,500 feet or less and the East Texas model for wells as deep as 5,000 feet.

The clutches on the larger unit are proportionately heavier and for depths around 3,600 feet the E. T. model can be used very economically for cleaning out and, if necessary, deepening wells in East Texas. General service work such as pulling rods and tubing, bailing and swabbing can also be performed with any of these units.

The winch is mounted upon the truck body directly behind the cab and takes its power from a drive connected with the truck motor, or through a bevel gear box mounted on the frame and driven from the truck propeller shaft. By this system of mounting the truck bed is nearly all clear for any normal use, for carrying tools and other material needed around the lease.

One feature pointed out by the Frank's Manufacturing Co. in favor of its type of construction and mounting is that under the Texas laws the weight of the mounted unit is not included in bed load and as most of the truck bed is clear the full load of 7,000 pounds of tools and equipment can also be loaded on the truck.

NU-ALLOY
DROPS & SEATS
smooth and exacting in their operation. No flutter, chatter, or beating out of crown wings.
PETROLEUM EQUIPMENT CO.
NU-ALLOY BALLS & SEATS
FORT WORTH, TEXAS

Deep Well
PUMPING
EQUIPMENT

THE Texas Steel Company is now producing a complete new line of deep well pumping equipment. This equipment includes a new heavier style underpull Pump Jack, of arc-welded construction and Alemite lubrication. "It's a real Jack." In conjunction with this new Pump Jack is a new heavier constructed swing, arc-welded and with Bronze Bushed Bearings. Also a Backside Crank Assembly for pumping one or two wells more economically.

For information about these new pieces of equipment write for the new Catalog Supplement which is now ready.

Texas Steel
COMPANY
FORT WORTH, TEXAS

FIELD PROVEN

PUMPING EQUIPMENT for EAST TEXAS

NEW DESIGNS – anticipating East Texas requirements and especially engineered to meet them.

COMPLETE LINE - carefully developed during the last two years — now PROVED in the FIELD.

Consult "Oilwell" Field Engineers in East Texas, or "Oilwell" Engineering and Sales Headquarters at Dallas. Bulletins on request.

OIL WELL SUPPLY CO.

Branch Stores in all Oil Fields

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

"OILWELL"

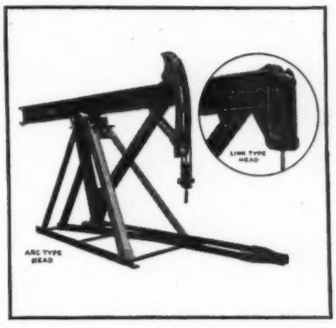
THE NEW IMPERIAL OILBATH GEARED POWERS

for central power pumping.— Dual Stroke Single Crank, and Single or Double Eccentric Designs. IMPERIAL No. 80 rated 80 H.P. input capacity at 20 strokes per minute or 115 H.P. at 30 strokes. IMPERIAL No. 150 rated 150 H.P. at 20 strokes per minute.

"Oilwell" Single Crank Imperial No. 80-SC provided with 30" and 36" strokes. ★

NEW DESIGN, All-Steel, Heavy Duty No. 16 and No. 12 Pumping Jacks

– with Oilbath, Weather-proof Bearings. Rigid Arc Welded structural frame and beam—designed to meet East Texas pumping requirements. Wide range, adjustable stroke with straight line motion. Easy to assemble—only four sections to put together.



"Oilwell" No. 16 Jack—16,000-lbs. polished rod load rating. ★

GEARED UNITS

– Silent, smooth running. Twin Counterbalanced Crank designs; also Single Crank with Beam Counterbalance. Double reduction speed reducer having heat-treated, helical cut gears with all shafts mounted in Timken Bearings.

"Oilwell" TC-20 Twin Crank Unit Power, rated 14,000-lbs. polished rod load. 20 H.P. Electric Motor input; 35 H.P. Gas or Oil Engine. ★

"OILWELL" TYPE 33 TUBING CROWN BLOCKS

—Available in *any combination* of beams and sheaves. Alemite grease packed weather-proof trunnion bearings. 22" semi-steel sheaves; 10" or 8" I-beams.

2268

SEAMLESS-STEEL **WORKING BARRELS** **PLUNGER PUMPS**

"OILWELL"

HEAT-TREATED **SUCKER AND PULL RODS** **TUBING AND ROD ELEVATORS**

VALVE PARTS, BALLS, DROPS, SEATS. HOOKS, TONGS, WRENCHES, ETC.

SPECIAL DROP-FORGED COMBINATION CLAMPS, LINKS, ETC.

Low Land, Swamps and Sandy Soil in East Texas Add Many Problems to Work of Engineers

By DEWEY T. ROSS
Installation Engineer, Tyler, Tex.

Since April 24 of this year, the East Texas Field has been producing at such a rate as to make the bottom hole pressure decline alarming. It has actually brought many of the lower pressured wells to the "stalling" point, or point where they have to be "kicked off" to make them flow. Many other wells have even refused to flow after attempt has been made to "kick" them and have been standing "dead" if not already equipped for mechanical production.

The terrain, climatic conditions and other agencies found in this far flung field all unite to increase producing costs in many parts of the field, and will necessitate giving more thought and study to pumping installations than in the majority of fields. Cheap, slip-shod methods of installing pumping equipment will no doubt result in poor efficiency in operations, causing loss of power, greater wear and tear on rods, tubing and other equipment, and possibly the junking of some of the wells long before they might otherwise be abandoned if correct, substantial installations are made. Too much cannot be said in regard to the economy of permanent and satisfactory concrete installations, installations which will cut the lifting costs to a minimum, and more than pay for themselves during the pumping life of the wells.

Deep Excavations

In parts of the field where the surface is covered with sand, this troublesome top layer is removed and the concrete set on a firmer stratum of earth. Excavations are often made from 7 to 8 feet deep to hold the concrete base of central powers. However, this entire space is not filled with concrete as the power itself is set approximately 3 feet below the surface, the heavy block of concrete under it being solid to the bottom of the excavation.

Excavations around the casing and control valves, on which the individual jacks are set, are also dug sufficiently deep to reach a firm foundation on which the concrete is poured. If the side walls cave during the excavation rocks are used to fill in such depressions, thereby making the concrete installation more secure.

Conditions of every lease have to be studied before installing powers. Some leases may require many holdups and holddowns for the pull rods, which run several hundred feet to connect with pump jacks at the wells. On one installation 12 holdups and holddowns had to be securely installed to pump a well across a valley from the power. This entailed pouring a power base sufficiently heavy to meet the situation which will be more exacting than in the majority of installations. However, a similar heavy base had to be installed to hold the largest units installed in the field. One power will pump 14 wells, one of which is located 2,440 feet from the central plant. A swing will be made in the long pull rod line to get around an intervening lease across which the line could not be constructed.

Elevated Roads

In other parts of the field swamp lands, creek and river bottoms offer problems to the installation engineers. In these places the concrete bases for the powers and jacks have to be extended to present a large bearing surface instead of being dug deep into the ground as on the aforementioned jobs. Some companies have built roads, dikes and levees to their wells in the swamps in the south end of the field, locating the wells at the extreme ends of these roads. These raised surfaces will be of great use when pump jacks and powers are installed, or if the wells are standardized, because they offer a firmer foundation than could be obtained otherwise.

Rod lines running from one well to another, or to a central power, in the swampy areas will have to be raised from 6 to 12 feet above the surface to prevent flood stage waters from washing trees and debris in to and breaking them.

On one well, in a flooded area, an 11-foot high concrete structure was poured for the standard pumping equipment installed. This structure used 110 yards of concrete, and nearly 500 sacks of cement.

The derrick floor was placed about 1 foot above the top of the concrete cellar, and a steel substructure was erected on the corner piers, forming a base for the derrick. All forms and anchor bolts were set with the aid of a surveyor's level.

Structures in low lying areas, such as the above, will last interminably, probably having to be blasted out if ever removed. Wooden structures would be in danger of being carried away, and connections broken causing repairs and further expense, because of flood waters, therefore operators will consider the initial cost as an economical one, when making a concrete installation in such a location.

Dry Season Installations

Operators will have to choose the dry season for making installations in the low lying areas as during the rainy season equipment and materials cannot be trucked to the locations, and concrete construction cannot be carried on under conditions which exist at those times.

The dry season should be used to great advantage in making installations, especially on those locations which are in the swampy or flooded areas. It will take twice as long to make an installation where materials have to be dragged through the mud and over almost impassable roads to the locations, and when the work is held up or retarded by beating rains. Companies may be unable to get the production from their well if they wait until the pressure falls to the pumping stage during the rainy season when it might be impossible to install pumping equipment.

One power unit job was installed on a south end lease during the rainy season last year. The heavy rains, impassable roads and mud conditions around the well caused the job to be strung out over 45 days, whereas under normal conditions it would have taken only about 30 days. The extra time ran the construction costs much higher than if the job had been done before the bad season started. Operators will benefit by consulting the installation engineers as to the best time for putting in the equipment, and will probably save themselves considerable expense by preparing for the emergency.

Road Crossings

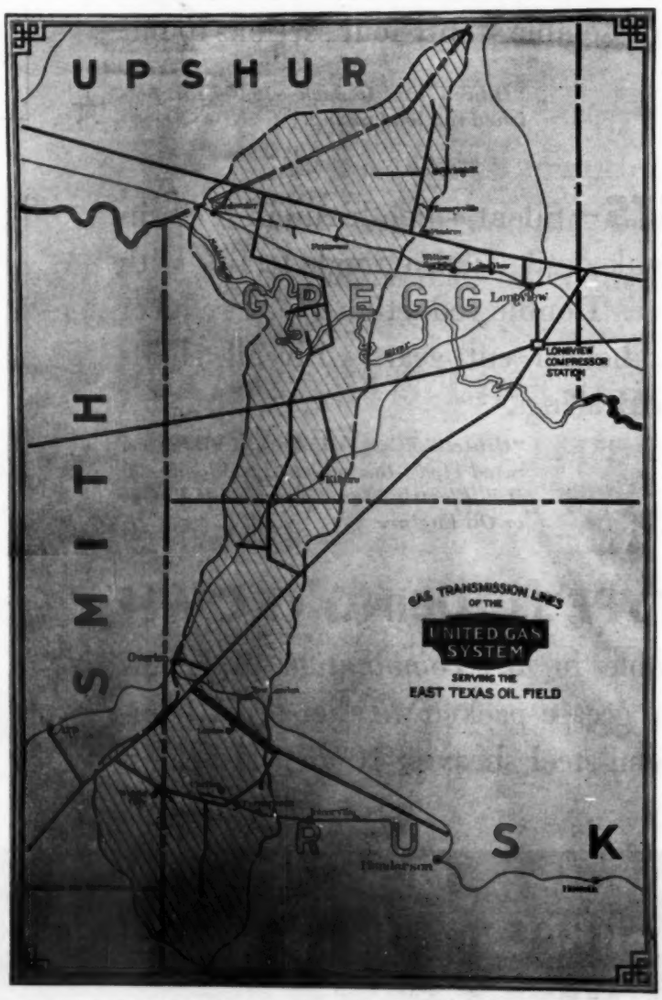
One company which has rigged up a central power on an east edge lease, had to run pull rods over or under a road traversing the field. The county granted permission to the company to raise the road about 2 feet so the lines could be run on a level from the power unit to adjacent properties. This created but little expense in road construction, which could have been done only during the dry season. If the company had waited until later to equip these leases for pumping it would have had to resort to other methods for running the lines, or would have had to make standard installations on each well.

On another installation in the field a road had to be crossed in similar fashion. This road is to become a highway later, therefore the rod lines had to be run at a considerable depth below it. To do this a ditch was excavated some distance on each side of the road so as to allow grading and widening when the highway is constructed. Two holdups and two holddowns were placed in position on each side of the road to hold the rod lines in position as they came out of the ditch. About 54 feet of 10-inch pipe was placed in the bottom of the ditch. Top of this pipe was about 2½ feet below the crown of the road to prevent any interference with the highway construction.

Many roads, highways and trails traverse the field to complicate the installation of pumping equipment, and if the installation jobs are given the engineers in advance they will have sufficient time in which to study the separate jobs and plan accordingly, thereby saving the lease owners much expense and worry, and enabling them to continue to produce their wells even though they fall to the pumping stage during the worst weather and under the most difficult conditions.

One control power unit installation took about three weeks under good weather conditions. Smaller installations, standard rig jobs, take from 8 to 10 days, according to the kind of equipment installed, and amount of material used in the installation.

United Gas System Reaches Whole East Texas Field



Three main transmission lines of the United Gas System, together with a number of laterals, carry gas to locations in all sections of the East Texas Field. Gas is transported from producing fields in the Shreveport and Monroe areas of northern Louisiana. Compressor stations located at Waskom and at Longview can pump gas through lines serving the East Texas Field. The present schedule of gas rates for pumping in East Texas is as follows: 22½ cents per thousand for the first 200,000 feet used per month, 11¾ cents per thousand for all additional consumption per month.

Save $100 Monthly Per Well with McCormick-Deering Power Units

IN these days of stringent economy, oil men have found a very effective source of extra savings through pumping oil wells with McCormick-Deering Power Units. Great numbers of operators have displaced electricity and steam with these efficient power units equipped for natural gas consumption. Stephens & Burrington, oil field dealers at Long Beach, California, report the sale of more than fifty during the last few months and say they are well on the way to the hundred mark.

Many examples, like that of the Bear State Oil Company quoted at the right, are on record showing monthly savings of more than a hundred dollars per well. McCormick-Deering Power Units can be installed at very nominal cost in place of present equipment and can easily pay for themselves in from six to eight months' use. These efficient, compact power plants deliver an abundance of flexible power for a great variety of operations ranging from oil-field work to the operation of excavating, construction, sawmill and irrigation equipment, etc.

McCormick-Deering Power Units are available in four sizes, including a new Diesel unit. Power range is from 30 to 50 h.p., delivered on belt, gear, chain, or direct drive. They are backed by the same standards of manufacture and service that have accounted for the great popularity of International Trucks and McCormick-Deering Industrial Tractors. Ask the nearest Company-owned branch or McCormick-Deering distributor or dealer about them.

McCormick-Deering Economy

G. Ahlman, secretary of the Bear State Oil Co., writes:

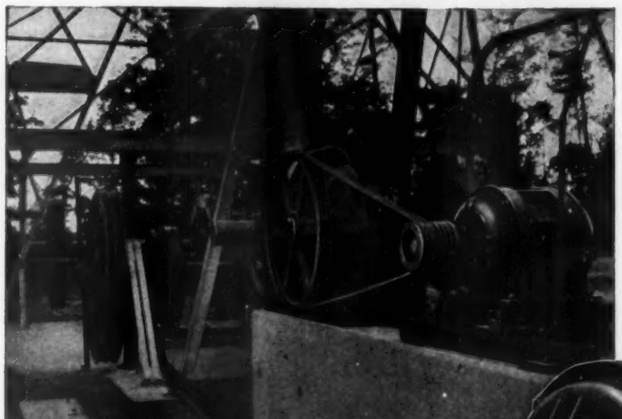
"On September 10, we installed one of your McCormick-Deering Power Units . . . it is beyond our expectations for service. Where we had been paying $113 to $117 per month for electric power we are now paying about 27 cents per day for gas to operate this unit, plus lubricating oil. This is practically all the expense we have on it. We can recommend it very highly."

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. OF AMERICA (*Incorporated*) Chicago, Illinois

McCORMICK-DEERING INDUSTRIAL POWER

PRESENTING

Two G-E Motors for new economies in pumping



A G-E triple-rated Y-Delta induction motor driving an oil-well pumping rig in an East Texas field

G-E Gear-motor operating an oil-well pumping rig in a Gulf Coast oil field, Texas

1. Triple-rated Y-Delta Motors

Oil men find that the most economical method of well pumping, under present regulations, is to use a motor of low horsepower rating in order to keep electric power costs at the minimum. That's why they select G-E triple-rated Y-Delta motors, which provide high efficiency and good power-factor at three horsepower ratings — a low rating for present production, a medium rating for an increased allowable, and a high rating for full production or for pulling rods and tubing.

These motors, which cost little more than ordinary single-rated motors, will lower your pumping costs and will take care of your future as well as present requirements.

2. Gear-Motors

You can obtain new economies in slow-motion pumping by using G-E gear-motors because they combine the economies of high-speed motors with accurately cut helical gears that run in a bath of oil. Gear-motors are efficient. They deliver the full-rated motor horsepower at the output shaft. They reduce installation expense, too, because they are so compact and easy to install.

Additional information on these dependable motors can be obtained at the nearest G-E office, or from General Electric, Schenectady, New York.

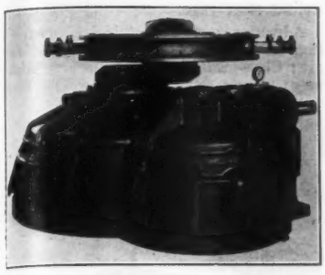
200-695

GENERAL ELECTRIC

National's Geared Power and Jacks Strong, Rigid

The Type G-100 geared power offered by the National Supply Co., is a compact, strong, dependable power, capable of handling heavy well loads. The construction provides great strength and rigidity without excess weight.

The gearing has been designed with large-diameter, wide-faced pinions, which insures low bearing pressures and efficient oil film lubrication. First reduction is through a set of Gleason carburized



alloy steel spiral bevel gears; second reduction is a set of wide-faced single helical gears, generated by National on the Sykes machine. Gearing is entirely enclosed in a rigid housing, dirtproof and oiltight.

Every bearing in the G-100 power is a timken, selected to give a high factor of safety. Extremely rigid mountings have been provided so that correct alignment is maintained.

Correct design, high quality materials and workmanship and continuous, filtered lubrication result in reduced power losses and minimized wear, and insure years of service.

National's Type D-100 or D-130 jacks are recommended for use with the G-100 power. These jacks are of all-steel, arc-welded construction, exceptionally strong and rigid. Beam is adjustable; lift closely approximates the vertical; large, oversize bearings are efficiently lubricated. The jacks are entirely self-contained and self-supporting, requiring only the main foundation block. Field experience is said to have demonstrated that these jacks furnish an economical installation and long, dependable service.

Cleanout Jobs Performed Fast With Horn Invention

A device invented by William Horn, 511 Wooster Street, Marietta, Ohio, for use in cleaning oil and gas wells, agitates fluid at the bottom of the hole and mixes sand, paraffin, cavings and other sediment with acid or water into a fluid mass which then can be bailed out.

The tool consists of a plunger in a steel barrel. It is attached to a string of tools and the drilling motion imparts movement to the plunger. As the plunger moves up and down in the barrel fluid is drawn in at one set of openings and discharged under pressure from another series. This will force the fluid into all parts of the hole and mix materials accumulated in it in such a way as to permit their later removal by bailing.

It is said by the inventor that the tool will do the job thoroughly in about one-fourth the time required for cleaning with an ordinary string of cleanout tools. A bit can be added below the agitator body if desired to break up hard-packed materials.

Garlock Lubricant Pastes Supplant the Hand-Mixed

The Garlock Packing Co., Palmyra, N. Y., with a view of providing correct lubricants, has developed Garlock lubricating paste compound No. 2 for steam and water packings and Garlock lubricating paste compound No. 3 for packings working against gasoline and oils.

Compounded in the company's laboratories, these pastes are said to contain the highest grade ingredients and to be the most effective and economical lubricants for Garlock packings. They are intended to replace hand-mixed lubricating compounds. When applied to packings at regular intervals friction is reduced, maximum efficiency is obtained and the life of the packings in service prolonged. The two lubricating pastes are packaged in standard 12-ounce, 24-ounce and 5-pound cans. They are also furnished in larger special containers of any size.

Proper and regular lubrication of packings in service is essential to successful operation. Insufficient lubrication, or the use of the wrong kind of lubricant results in excessive friction, scored rods, leaks and ultimate destruction of the packing.

Power Units for Oil Field Are Developed by Cummins

Two power units especially designed for oil field service in driving pumps, generators, etc., have been developed by the Cummins Engine Co., Columbus, Ind., manufacturer of Diesel engines. These units, one built up with the company's four-cylinder engine and the other with its six-cylinder, are complete with radiator, clutch power takeoff, etc.

The performance of trucks powered with Cummins Diesel engines has been arousing the interest of oil field and pipe line men. A typical record cited by the Cummins company is that of a six-cylinder truck which hauled an average load of 68,400 pounds a total of 34,334 miles in five and one-sixth months with a total cost of $307.38 for fuel oil and $73.50 for lubricating oil. The truck traveled 6,641 miles per month over mountain roads at an average cost of .00088 cents per mile for fuel oil and a total cost of .011 for both fuel oil and lubricating oil.

Portable, Large Capacity Compressor Is Introduced

A new size portable air compressor providing 505 cubic feet displacement against the customary working pressure of 100 pounds per square inch has been introduced by the Sullivan Machinery Co., 400 North Michigan Avenue, Chicago. This compressor was developed to

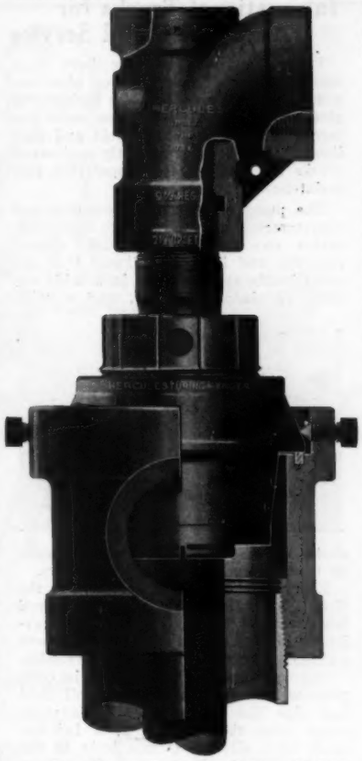
meet the demand for a really portable one of large capacity and high efficiency.

The Sullivan design has been followed in general, maintaining the essential characteristics of mobility, dependability and simplicity. This unit is a two-stage, four-cylinder type compressor, powered by a six-cylinder Climax engine, coupled to the compressor by the standard Sullican gear type coupling, with twin disc clutch and self-starter. The entire rig is mounted on a heavy fabricated steel plate frame and mounted on steel wheels with rubber tires, with single tires on the front wheels and dual tires on the rear wheels.

A four-cylinder "V"-type compressor is used. Two low-pressure cylinders 11½ inches in diameter are set on one side of the crankshaft and two high-pressure, or discharge, cylinders 6½ inches in diameter are set on the other side of the same crankshaft. An intercooler is provided between the two stages, situated just in the rear of the compressor unit. High actual air delivery and power economy follow this design. Sullivan standard "wafer" valves are used throughout.

Hercules Tubing Hanger Insures Greater Safety

The Hercules adjustable packing tubing hanger for supporting tubing at the casinghead, manufactured by the Hercules Tool Co., Tulsa, is designed to pack off under pressure where gas or air is used



to flow the well. It eliminates the hazard of dropping tubing caused by pinching off collars, rigs burning or blowing down or by other accidents. To repack this tubing hanger it is not necessary to lift the tubing, disconnect the well or interfere with pumping operation. Repacking is done by simply unscrewing the packing nut, inserting the rubber packing ring and then screwing the packing nut back into place.

The Hercules tubing hanger is placed down in the casinghead, out of the way, and it extends only 1 to 5 inches above the top. It is not necessary to lower or change the position of the casinghead, since it does not interfere with pumping equipment. The design prevents the slips from dropping through into the well. It can be used with safety for any size tubing on the deepest well.

Other Hercules products include the Hercules tubing anchor, designed to eliminate parting and dropping of tubing in pumping wells, and the Hercules upset pumping and flowing tee, a combination thread tee for connecting up a pumping or flowing well.

New American Flow Packer Used to Marked Advantage

On leases in the Seminole Field there was constant rod breakage caused by excess weight of oil without sufficient gas to help lift the oil from the working valve. An American Iron & Machine Works Co. representative suggested an American flow packer be run in conjunction with the working barrel with perforation just below the barrel. One company did so and it not only reduced rod breakage but allowed the well to be pumped more easily and increased production. Other companies found it cut the cost of lifting the oil. Some wells have to be pumped a few hours only and then flow the rest of allowable.

Many companies use this packer to run acid into lime formations. This is accomplished by placing a lubricator on the flow line and then lubricating the acid down by flowing the well through the tubing and back through the casing, allowing acid and oil to pass through the valves in the packer which lets the acid go direct to the oil formation and return through the perforation. This method has been used to clean paraffin from tubing with chemicals.

Some companies adopted this packer to help flow wells by artificial pressure and found it allows them to flow with less pressure and increasing production 15 to 60 per cent.

Frequent Pulling of Well Avoided by Toncan Tubing

Well tubing made from Toncan copper molybdenum iron by the Republic Steel Corp., Youngstown, Ohio, is offered as a solution of certain pumping problems arising from corrosive conditions. Oil producers in territory where salt water and free sulphur necessitated frequent pulling of tubing to replace the first joint above the pump or to replace the entire string are said to have found relief from this expensive proceeding by the use of Toncan iron tubing.

Toncan iron, as used in the manufacture of well tubing, line pipe and other oil industry products, is said by the company to have the following advantages:

It resists to a high degree the many and varied types of corrosion. This resistance is not confined to the surface or "skin" of the metal, but is uniform throughout the entire wall thickness.

It combines with the high rust resistance of an alloy iron the desirable physical qualities of the highest grade open hearth steel to a marked extent.

It is one of the most workable of materials and can be handled like any iron. Unlike other ferrous materials, cold working—cutting, bending, threading—in no way affects the corrosion resistance of Toncan iron pipe.

It takes a sharp clean thread easily and is not hard on dies.

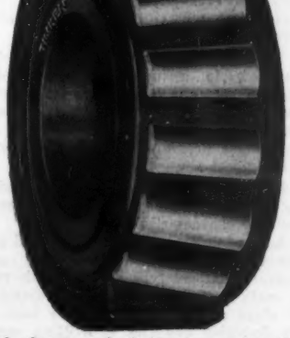
It welds easily. The use of Toncan iron welding rod insures an installation of equal rust and corrosion resistance throughout.

It takes and holds a galvanizing coating equal to that found on the best quality iron pipe, adding the protection of a heavy coating of zinc to the already high rust resistance of the pipe material itself.

Through its long trouble-free life it has been found to cost less per year of service and to constitute insurance against pipe failures and frequent costly replacements.

Timken Roller Bearings in Wide Use in the Oil Field

The Timken tapered roller bearing, made by the Timken Roller Bearing Co., Canton, Ohio, because of its tapered construction carries all types of loads, ra-



dial, thrust or both in any combination. This, combined with the fact that it is made of special Timken alloy steel, gives it greater load capacity, size for size, according to the manufacturer. Timken bearings, which are in wide use in oil field equipment, are performing a vital function by imparting smoothness of operation and greatly prolonged life.

Every Macwhyte Wire Line Is Internally Lubricated

Every wire line manufactured by the Macwhyte Co., Kenosha, Wis., is internally lubricated, that is, every wire in the rope passes through a heavy viscous lubricant which is not affected by the elements and acid water and most acids. Heat has little effect upon it up to a temperature of over 200° F. Cold will not cake it. The application of this lubricant to each individual wire before it is laid into a strand completely packs the line full of the best lubricant known for wire rope.

Left, 6x19 hemp-center rotary or casing line. Right, 6x19 wire-rope-center rotary or casing line

All Macwhyte wire lines are especially made for the use to which they are applied and may be obtained in preformed as well as regular construction except that for cable tool lines preformed construction is not recommended.

The kind of drilling and the rigging determine the proper wire line to use. Complete recommendations for proper lines to use for given equipment will be furnished by the company on request.

The Macwhyte Co. makes wire lines for every type of service in the oil fields, such as rotary drilling lines, cable tool drilling lines, sand lines, guy lines, coke still cracker lines, casing lines, pumping lines, tubing lines, sucker rod lines, swabbing lines, winch ropes, tow lines, fall lines, dead lines, throttle cord and torpedo lines. The company provides lubricant for lubricating the outside of the ropes.

Baroid Sales Co. Offers Colloidal Drilling Muds

Products of the Baroid Sales Co., 837 Jackson Street, Los Angeles, Calif., include Baroid, an extra-heavy colloidal drilling mud; Aquagel, a trouble-proof colloidal drilling mud; Stabilite, a chemical mud thinner; Visco, a petroleum emulsion breaker, and the Lemco mud screen, for removing cuttings and abrasive material from drilling mud.

Baroid, a specially processed pulverized Barytes, is a uniform, water-ground product of approximately 4.2 specific gravity, almost twice that of ordinary clay, and is used for controlling oil, gas and water pressures encountered during drilling.

Baroid is compounded and processed so that it has excellent suspending and wall-building characteristics.

Aquagel is a specially selected and prepared clay which contains a high concentration of gel type colloids. This type of earth is found in small quantities in all clays and is responsible for most of the desirable qualities of drilling muds. It is the gel-type colloids which give clays their wall-building properties in the hole.

Stabilite is a liquid chemical compound, developed after several years research and field tests, for reducing the viscosity of drilling muds without destroying their wall-building properties.

Visco is an improved chemical compound for the treatment of emulsified petroleum.

The Lemco mud screen has been used for over three years and under many kinds of drilling conditions as a successful means of eliminating sand and cuttings from the drilling mud.

International Trucks for All Types of Oil Service

International trucks long have been known in the oil fields and on pipe line construction because they are designed to give uninterrupted service even under the terrific punishment of oil field and pipe line conditions. These correctly engineered trucks are economical in operation and maintenance.

The program of many companies and contractors calls for complete standardization on International trucks. These concerns and individuals know that Internationals are available in a wide variety of sizes and types, and a wide

choice of chassis lengths and equipment to meet every hauling job they have.

Every International is protected in the field by Harvester company-owned branches and International dealers service stations at convenient locations where efficient economical service is available.

The International truck line is complete with a chassis for every oil field and pipe line requirement. These units range from the Model D-1, a half-ton truck with all-steel pickup body to the massive 7½-ton Model A-8. There are 1½-ton Internationals with 4 and 6-cylinder power plants and 6-cylinder 2 and 3-ton models. For heavy-duty hauling there are trucks of 2½, 3½, 5, and 7½-ton capacities. All of these Internationals are built for years of dependable service.

Baker Cement Equipment Designed for Efficiency

The Baker line of equipment for guiding, floating and cementing casing in oil wells, offered by Baker Oil Tools, Inc., Huntington Park, Calif., is designed to meet all requirements for safety, efficiency and economical operation without the use of any metal in the internal construction. Only concrete and a minimum quantity of bakelite are used in constructing the guide, plug and valve assembly.

The efficiency of all items of Baker cement floating equipment was increased by carefully engineered improvements made during 1932. The most important change was the revised design of the bakelite valve assembly, and incorporation of a live rubber seat for the buoyant bakelite ball. Positive leakproof sealing is now obtained under the lowest or highest pressures encountered during floating and cementing operations.

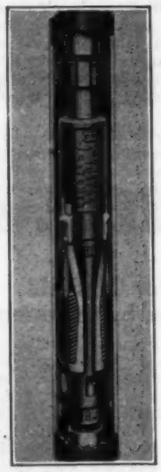
Distinct advantages include greater area of circulation passages, superior valve efficiencies, increased strength so that Baker cement equipment is now stronger than the collapsing strength of the casing, and drillability. "Drillability" means that no metal is used in the internal construction of any Baker cement equipment; and that only concrete and bakelite are present to be easily drilled up and circulated away.

The above and other improvements designated, were made without establishing a new model series.

Baker cementing and floating equipment has the necessary strength to resist hydraulic pressures equal to the ultimate collapsing strength of the heaviest weights of grade "D" casing.

Many Operators Adopting Surestop Tubing Catcher

To eliminate the danger from parted or dropped strings of tubing, many operators in East Texas are equipping their wells with the BJ Surestop tubing catcher, manufactured by Byron Jackson Co., and distributed through the principal Mid-Continent Supply stores.

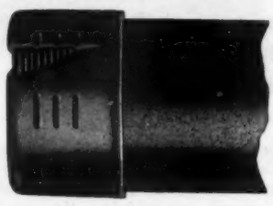


The short overall length of this catcher overcomes any tendency to "hang up" while running in; ample circulation passages prevent setting of the slips by heavy mud or gas pressures; while the extra large slips, with teeth cut at an angle, insure quick, positive setting, and easy release. By equipping every tubing string with a Surestop, with a BJ anchor attached, the tubing is securely positioned, and all vertical motion, or "breathing," is prevented. This installation saves on tubing coupling replacements, adds to pump efficiency, due to the fact that the pump is anchored and enabled to take a full stroke.

Other BJ tools adapted to East Texas conditions are the new rod hooks and tubing hooks, with a patented "locking arm" joining the bill of the hook to the body, which increases the strength, eliminates metal fatigue, and prevents accidental opening and dropped loads. The new BJ open end tubing tongs owing to their weight of only 14 pounds, permit them to be stabbed on the tubing, where they hold and ratchet perfectly. The BJ one-piece rod elevator, equipped with two sets of operating latches, one in front and one in the rear, does away with the necessity of reaching around the elevator to release the rods. BJ tubing elevators, weldless links and snapon tubing tongs are well known in East Texas and in other fields.

Wedge Protectors Made to Prevent Harm in Handling

Wedge protectors, made by Wedge Protectors, Inc., 5208 Harvard Avenue, Cleveland, Ohio, include snap-style thread



protectors, standard and pipe line thread protectors, tin plugs, paper-lined thread protectors, caps to meet individual specifications and thread protectors with drain holes. All are made to meet the demand for complete protection of easily damaged parts of goods exposed in handling or in transit.

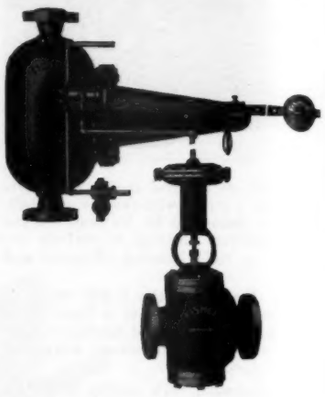
The snap-style protectors are readily snapped on by hand, but must be screwed off. The thread protectors with drain holes are screwed on and off by hand, like the standard protectors, but have the additional advantage of the drain holes. Both have the Wedge locking feature, which prevents jarring off in transit. The tin plugs are designed to protect holes tapped or plain. In the paper-lined thread protector the lining forms a cushion. This protector is easily forced on by hand, but must be screwed off. It does not mar the softest metal.

Wedge split chill rings are designed to meet every requirement for the efficient welding of pipe. They make centering and lining up of pipes a simple matter. The standard or construction ring is for gas or electric welding. A split chill ring made especially for electric welding is of sturdy construction which prevents burning through.

Drawn-Steel Welded Float Cage Announced by Fisher

The Fisher Governor Co., originator of the float-cage type of liquid level controller, has recently announced an outstanding development of a drawn-steel welded float cage.

Advantages of this exclusive construction as enumerated by the manufacturer are: Close-grained wall of uniform thickness; 60 per cent lighter in weight than



other high-pressure float cages; much easier to ship, handle and install; forged-steel flanges on top and bottom of cage; all welds are of shielded arc process and in accordance with A.S.M.E. specifications; equipped with friction-free ball-bearing stuffing box; lower initial cost and lower maintenance cost.

The illustration is of the Fisher Type 235C remote type level control with drawn-steel welded cage.

The drawn-steel cage can also be furnished with lever valves for direct operation.

Complete information regarding this and several other new Fisher developments in various automatic control and regulating devices can be obtained by writing to Fisher Governor Co., Marshalltown, Iowa.

Three Meter Combinations Made Available by Bailey

Three general combinations of meters are offered by the Bailey Meter Co., Cleveland, Ohio, in its line for steam, water, gases and other fluids, namely indicating and integrating; recording and integrating; indicating, recording and integrating. The recording and integrating fluid meter is best suited for most installations. The record is made in pounds per hour, gallons per minute or any other desired units on a 12-inch diameter, 24-hour chart.

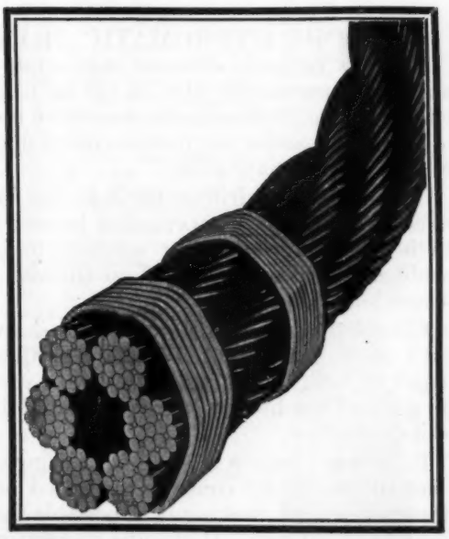
Accurate analysis of the record is easy throughout the entire flow range since the flow graduations are uniformly spaced. This feature facilitates comparison with records of pressure and temperature which may be obtained on the same chart, when desired, by incorporating auxiliary recorders in the flow meter casing.

The total flow is given in pounds, gallons or other units by a six-unit counter behind a small window in the meter name plate. This may be read as easily as an automobile mileage register.

The flow mechanism is operated by the difference in pressure produced between the inlet side and the outlet side of the orifice or other primary element inserted in the pipe line. The inlet, or higher pressure, is connected to the interior of the mercury sealed Ledoux bell, and the outlet or lower pressure is applied to the exterior of the bell.

Measure rope with your own yard stick

PER-mile-car-travel . . . per-foot-hole-drilled . . . per-M-feet . . . it doesn't matter which you measure it by, so long as you do measure it by service. Wickwire Spencer sells its numerous constructions of rope to their respective industries on one and only one basis . . . that each rope when measured by its own yardstick will equal or lower past rope costs. This is not a guarantee but a fact, proven so often that this company is willing to predicate its future sales on the service rendered by the first and later units used.



ALSO WISSCOLAY PRE-FORMED ROPE

Wickwire Spencer manufactures all sizes and types of wire rope in PRE-FORMED as well as in standard lays. WISSCOLAY is the name given to Wickwire Spencer Pre-formed Wire Rope. It has Wickwire Spencer Quality.

Send for this free Wire Rope Book. It will prove of great value.

WIRE ROPE
by Wickwire Spencer

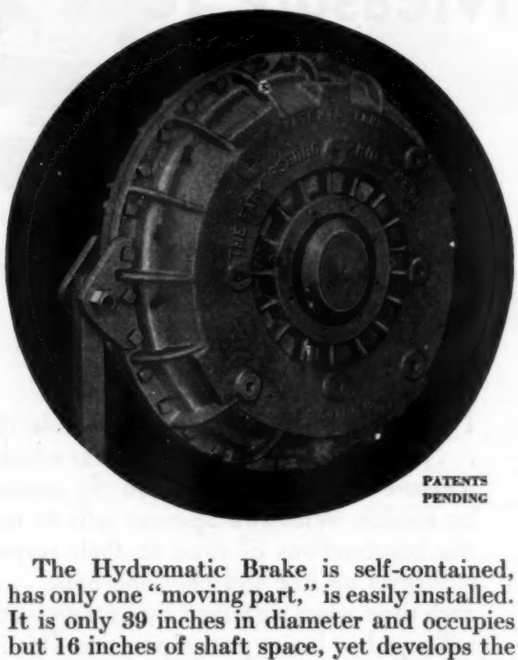
Wickwire Spencer Steel Company, 41 East 42nd Street, New York City
Branch offices and warehouses: Buffalo, Chicago, Worcester, Tulsa, San Francisco (Pacific Coast Headquarters), Los Angeles, Portland, Seattle. Export Sales Dept., New York City

Fluid Friction for Safe Braking-

Hydromatic....

REGISTERED, U. S. PATENT OFFICE

A Revolutionary Principle in Oil Field Brakes



PATENTS PENDING

THE HYDROMATIC BRAKE is radically different in principle from any brake previously used in the oil field. It employs *fluid friction* for its resistance instead of the *mechanical or dry friction*, relied upon by oil field brakes since 1859.

The deeper the drilling the safer the brakes must be. The HYDROMATIC has proved itself to be the long-sought-for solution to brake problems on deep wells and on shallow wells where load conditions are severe.

Complete and exhaustive tests in shop and field have demonstrated that, regardless of depth of well, the Hydromatic Brake justifies its general use by the safety and smoothness of its operation.

It is more than a brake—it is a governor that automatically controls the speed of the descending load, making it impossible for the hoist to "run away." It absorbs and dissipates energy and heat without wear, eliminating cracked and scored drums and frequent lining replacements on the regular friction brake used to bring the load to rest.

The Hydromatic Brake is self-contained, has only one "moving part," is easily installed. It is only 39 inches in diameter and occupies but 16 inches of shaft space, yet develops the enormous capacity of 3130 H.P. at 540 R.P.M.

It has been used on the sand reel and bull wheels of the world's record 9,100-foot cable tool well near Spencer, W.Va., and with success and satisfaction on other deep wells. At Barbers Hill, in the Texas Gulf Coast area, the Texas Gulf Producing Company has drilled three wells with draw works equipped with one of these brakes and the mechanical brakes have shown no appreciable wear.

The Hydromatic Brake can be installed on new or old draw works or on bull wheels and sand reels. The Parkersburg Engineering Department will gladly make recommendation as to these installations.

Send for Booklet G-5-33

The Parkersburg Rig & Reel Co.

Executive Offices and Main Plant

PARKERSBURG, WEST VIRGINIA

NEW YORK - TULSA - DALLAS - HOUSTON

New Remote Control Valve Is Developed by Northern

The new Copes thrustor-operated control valve for centralized remote control of flows of gases or liquids under pressure has been put on the market by the Northern Equipment Co., Erie, Pa. This device is operated by a General Electric thrustor, mounted at the side of the valve by a bracket firmly bolted to the valve

bonnet. The thrustor is a self-contained power unit, consisting of a motor controlling an improved hydraulic cylinder. It applies a straight-line, constant-pressure thrust on the valve lever, to open or close the valve, depending on the service requirements. The thrustor operates in one direction only, the weight acting to return it to the original position when the electrical circuit is broken.

The thrustor can be controlled by push-button or time switch. External adjustment is provided to increase or decrease speed of the valve movement. The valve can operate at a rate of 40 times per minute without injury to any part. It has sufficient power to handle heavy viscous liquids. The motors cannot be overloaded, regardless of the amount of valve opening, and no limit switches are needed. Either 110 or 220-vole, 60 to 25 cycle, alternating current, or 125 or 250-volt direct current may be used. The valve is the Copes Type BI used with Copes feed-water regulators.

Largest Bandwheel Power Ever Built Is Installed

The largest bandwheel power ever built, 52 feet in diameter, has been completed by the Joseph Reid Gas Engine Co., Oil City, Pa., and installed in Texas. The 28-inch face of the wheel permits use of a belt 26 inches wide.

The wheel is made of eight sections of rolled steel plates to which are electrically welded stiffening angles on the inside of the rim. Eight drivers of two members each are used, these being made of heavy angle iron. The wheel is supported and kept true by 48 spokes, 16 of them having turnbuckles through which necessary adjustments can be made.

The wheel is carried on a heavy shaft of special carbon steel shrunk into a cast iron base. The latter sets in a subbase grouted into the concrete foundation. If it is ever necessary to remove the power, the base to which the shaft is attached and on which all the moving parts are carried can be lifted off the subbase without damage to the concrete foundation.

A heavy semisteel sleeve fits over the shaft and two eccentrics and the wheel hub fits over this sleeve. The entire assembly is held in place by two large binding bolts. The top eccentric has a throw of 30 inches and the bottom one a throw of 36 inches.

Two Timken roller bearings are used, one at the bottom and one at the top of the shaft. The larger of these bearings is 19½ inches outside diameter and the other is 14½ inches.

The wheel hub and eccentrics include Reid patented dust covers which prevent dirt and sand from getting into the lubricating oil and between the bearing surfaces. The drive from the wheel hub to the upper eccentric and from the upper to the lower eccentric is done with a wedge-locking device which can be readily adjusted.

Three heavy steel strain rods are attached to the top of the power shaft. The other end of each is attached to concrete anchors in the ground. These take care of any side pull on the upper end of the shaft.

The connections for attaching the wells to the power consist of two steel plates bolted to the eccentric ring and to these are attached, with a 2-inch steel pin, two straps forming a clamp for the pull rod. The power weighs 21,300 pounds, and the belt tightener weighs 1,780 pounds. This power is capable of transmitting 100 horsepower and will be used to pull a group of wells, each about 3,000 feet deep.

B-M-W Junior Insert Pump Built to Stand Rough Use

The Bradford Motor Works, Bradford, Pa., has put the B-M-W Junior insert pump on the market as possessing all the valuable features of earlier pumps, but as more rugged and giving longer runs before replacements are necessary. It combines the plunger principle with that of the common working valve. The cups are 1⅛-inch, while the plunger is 1-inch. The smaller capacity may be obtained simply by removing the cups. When cups are worn the pump continues to function until the stuffing box packing is gone, insuring long life.

The B-M-W Junior insert pump is inserted within the standard working barrel. Sand is prevented from settling around the pump by two seating rings immediately below the stuffing box. The lower valve is also provided with two seating cups, insuring rigidity and alignment.

Lengths are designated by length of working barrel in which the pump is used. For example, the 6-inch pump has a tube 4 feet 7 inches long and is the proper length for use in a 6-foot seamless steel working barrel. An adapter can be furnished if it is desired to seat the lower valve in the top of the working barrel or in a short special seat. The outside tube has more than ordinary wall thickness, the size being 1½ inches O.D. by 1⅛ inches I.D. The plunger tube is of alloy steel, ground and polished. Triad cups are standard equipment.

Friction-Free Diaphragm Valve Made by Tagliabue

Exceptionally low friction loss is a characteristic of a meter developed by the Ralph N. Brodie Co., Sixty-first and Lowell Streets, Oakland, Calif., and

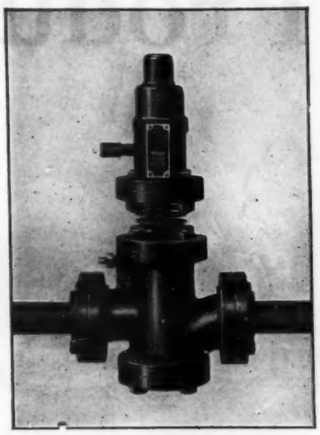
designated as Model X-300. In addition, according to the manufacturer, it maintains high speed under gravity pressure, requiring less power to operate on pump installations, the power being supplied by the gravity flow of the liquid.

This new meter will start and operate on as low as a 1-inch head. It is equipped with a 3-inch inlet and outlet, has a capacity of 300 g.p.m. and will withstand a working pressure of 125 pounds.

It is asserted that the meter will operate satisfactorily either under gravity or under pump pressure and is particularly adapted for use at the loading rack; also on lines from tank cars or barges to storage tanks; in refineries and on pipe or gathering lines.

Old Difficulties Removed by Area-Type Flow Meter

Difficulties formerly encountered have been removed by the Brown area-type flow meter, perfected by the Brown Instrument Co., Philadelphia, Pa., to measure the flow of certain fluids, such as heavy oils, chemicals, etc. Measurement of the flow of such fluids was formerly difficult because of the complex arrangement of piping and seals required be-



tween the meter body and pressure taps when using standard differential and orifice-type flow meters. Seals and auxiliary piping between the meter body and pressure taps are not required in the area-type flow meter because the meter is installed directly in the pipe line.

Heavy oils must be heated in order to flow freely and the transmission of any pressure condition from such a fluid always entails difficulties due to the cooling of the fluid in the lines connecting the pressure chambers with the pressure measuring device.

Various means have been tried for eliminating the difficulty of increased viscosity of the fluid when it enters the connecting lines. The most successful scheme prior to the introduction of the area-type flow meter has been that of paralleling the orifice-to-manometer pipes with other piping carrying low pressure steam in order to heat the oil in the manometer lines. The combination was usually insulated. While this plan worked better than others it presented objectionable features owing to the cost of installation, the cost of the steam and the long period of waiting required when the meter was started from "cold." All this is eliminated by the area-type meter because if the oil will flow through the pipe it will flow through the meter body.

Bridgeport Develops New Line of Pumping Hangers

A new line of beam pumping hangers, including eight models, has been developed by the Bridgeport Machine Co., Wichita, Kans. These hangers, designed for pumping wells up to 5,000 feet, embody unique features.

A two-piece, wedge-type polished rod clamp, which holds and adjusts itself to the rod, is used on all models. No tools are required to adjust or install the clamp as it contains neither screws nor bolts. It is detached from the hanger reins by a quarter turn upward. The construction of the clamp eliminates the danger of throwing the hanger off the beam or damaging the hanger in case the rods fail to drop. The clamp rides freely up and down on the reins in case of necessity.

Three types of alloy-steel, heat-treated heads are used. A knuckle-joint type head absorbs much of the lateral motion and permits the hanger to line up with the well even when the beam is off center or warped. The solid type head is used on installations where it is necessary to compensate for side motion or crooked beams. The wheel type head is designed to equalize the weight of the well on the hanger reins when wire line is used instead of steel rod reins.

Wire line reins and steel rod reins are interchangeable on all models of hangers, and hangers are designed for both regular and underslung beams. When used on a regular beam a saddle, in which the head rides, lowers the fulcrum point of the load, permitting a more nearly straight lift of the rods.

Vulcalock Valve Designed to Handle Corrosive Fluid

The Vulcalock valve, designed to handle corrosive and abrasive fluids under high pressure, pulsating pressure, throttling or suction, has been developed by the B. F. Goodrich Rubber Co., Akron, Ohio.

The valve is rubber lined with standard Goodrich Acidseal compounds, hard or soft, depending upon conditions to be met.

Action of the valve does not depend upon a flexible diaphragm. The resilient, rounded disc which snaps over a circular plate at the lower end of the stem provides a seal when brought into contact with the molded rubber-covered seat.

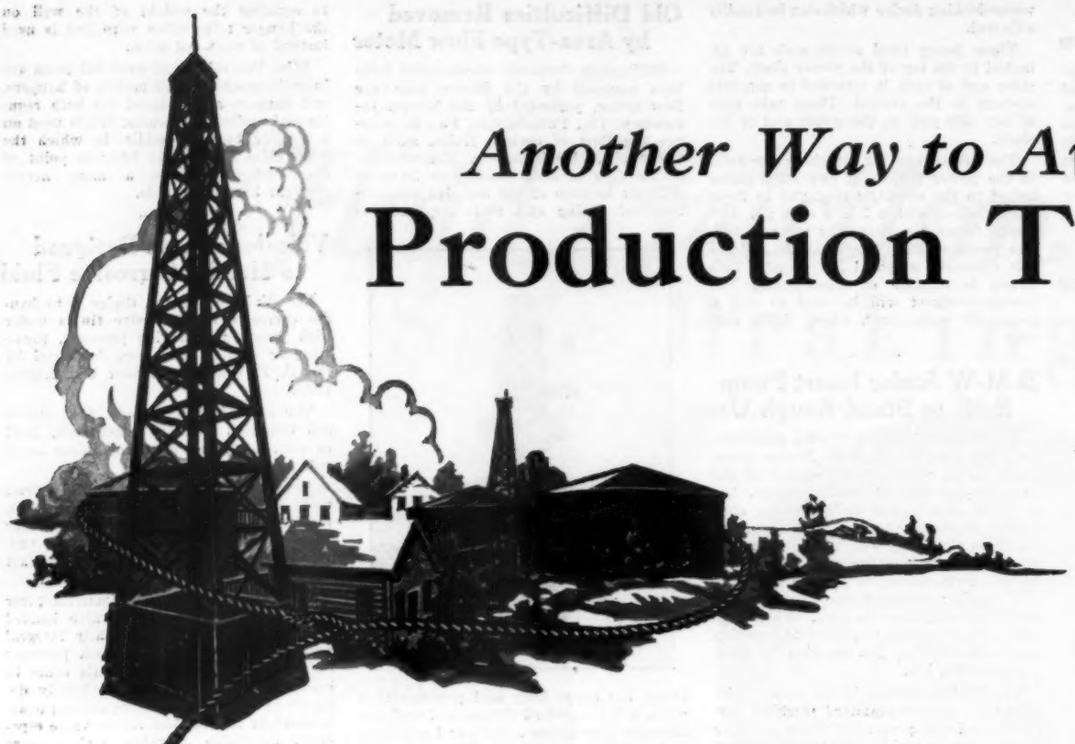
Features listed by the manufacturer include Acidseal lining of valve bonded to metal parts with practically integral adhesion by patented Vulcalock process; corrosive or abrasive materials come in contact only with rubber especially designed to resist deteriorating action; nearly straight line of flow makes valve especially adaptable to fairly high-pressure work and abrasive service; on sizes up to and including 6-inch there is no restriction of flow through the seat ring; resilient molded disc which snaps over circular plate at lower end of stem readily replaceable at low cost; molded seat ring, double seated and reversible for double service, can be easily removed; can be quickly changed from a straightway to angle valve or vice versa by removing body bolts, reversing the lower body section and replacing the bolts.

Buckling and Slapping of Rods Diminished by Guide

Buckling and slapping of sucker rods are said to be virtually eliminated by Walker sucker rod guides designed and manufactured by the Korner Engineering Co., 2026 Santa Fe Avenue, Los Angeles, Calif. The guides are said to have unusually long life. Some of them have been run continuously in crooked holes for more than eight months without showing appreciable wear, it is reported.

The fluid passes up through the center of the guides instead of up the outside. This prevents any obstruction to the fluid and there is no cutting of the tubing. When the guides are placed every 30 feet on the entire length of the rod, buckling and slapping are said to be eliminated, as the guides fit the inner wall of the tubing within three-sixteenths of an inch. Pump life is increased because the rod is kept in the axial center of the tubing. The guides reduce tubing action by eliminating internal friction on the tubing.

Walker sucker-rod guides are made of a special alloy cast iron base and take a high polish. They are clamped to the rod a short distance from the rod coupling, by four special lock bolts and are made in two sizes, 2½-inch and 3-inch for any rod up to and including seven-eighths inch. More detailed information is given in literature obtainable by writing the company.



Another Way to Avoid a Production Tie-Up

There are so many hostile elements conspiring to choke off production that it is well nigh impossible to guard against them all. However, there is little reason to put up with troublesome valves. This source of delay and expense is removed and forgotten when Darling Gate Valves are installed.

They have everything in their favor—strength, simplicity of construction, ease of operation and long-wearing parts. They have ample clearance through the seats against injury by tools, pipe, etc., passing through the valve.

Further details on request.

Darling Semi-Steel Gate Valve made in all sizes for General Field Use, Pipe Lines, Drilling Through, Well Control and Well Flow Lines.

Darling Forged Steel Drilling Gate Valve for extra high pressures and other hazardous conditions.

Darling Valve & Mfg. Company

Williamsport, Pa.

New York Oklahoma City Houston

Mid-Continent Distributors: International Supply Co.

California Distributors:
Hickey Pipe & Supply Company
3375 East Slauson Ave.
Los Angeles, Calif.

DARLING
GATE VALVES

New Vertical Gas Engine Is Developed by Transit

The National Transit Pump & Machine Co. of Oil City, Pa., has introduced a new type of prime mover for oil field service, the Transit vertical gas engine.

The outstanding features of this type of engine for oil field service are: Its

multiple cylinder produces and delivers an even and steady, smooth flow of power free from jars and shocks; its compactness, the engine being only 3 feet 2¾ inches wide and 3 feet 8 inches high, enables it to be closely connected to a central power within a small angle of the rod lines; unusual fuel economy and flexibility.

It is a moderate speed engine built for heavy-duty service and long life, and was designed to fill in the gap between the large slow-speed engine and the small high-speed engine.

The engine is equipped with late improvements, including twin ignition and automatic lubrication system which continuously cleans and cools the oil before admitting it to the engine.

This new Transit vertical gas engine can be furnished in two, three, four, six and eight cylinder sizes, ranging from 20 to 128 horsepower.

Geared, V-belted, or direct power take-offs can be supplied thereby making the engine adaptable for any oil country service.

Reference is invited to the full page advertisement in this issue showing a Transit vertical six-cylinder engine direct connected to an "Oilwell" Imperial No. 80, single crank type, geared power. Further information can be obtained by writing to the company at Oil City or Houston, Tex., for bulletin No. 430.

Individual Pumping Power Strong, Trustworthy Unit

The new "Oilwell" ODH-18 individual pumping power, introduced by the Oil Well Supply Co., is a structural-steel unit of construction similar to the TC-20 but with a single pitman and a single-crank speed reducer. It is a sturdy, dependable unit designed to pump individual wells in the East Texas Field efficiently and economically.

The oil-bath, roller-bearing equipped Westinghouse-Nuttall ODH-18 double-reduction gear unit has silent helical gears, a quick-acting brake on the high-speed shaft extension and a crank with five wristpin holes for 22½-inch, 30-inch, 37½-inch, 45-inch and 52½-inch polished-rod strokes. The base of the reduction gear unit is wide for rigid mounting on the structural-steel base.

The counterweights, of the plate type, are cast to slide conveniently over the extended end of the walking beam, where they are securely bolted in place.

The recommended horsepower input capacity of the ODH-18 unit is 20 with an electric motor, which can be conveniently mounted on a plate provided on the base of the power for that purpose. The recommended maximum pumping speed is 22 S.P.M. and the recommended maximum polished-rod load is 14,000 pounds, A.P.I. specifications.

Lunkenheimer Making Full Line of Oil Country Valves

The Lunkenheimer Co., Cincinnati, Ohio, manufactures a complete line of bronze, iron and steel valves in gate,

globe, angle, cross and check patterns; pop safety and relief valves, boiler mountings, lubricating devices, fittings, etc.

Distributors in all oil field and refinery centers carry Lunkenheimer valves and engineering appliances in stock and fill requirements promptly.

The "Guide" F 555 illustrates and describes the complete Lunkenheimer line, and is arranged to simplify selection. A copy should be in the oil producer's files. It will be sent upon request.

Axelson Develops New and Improved Pumping Devices

The engineering department of the Axelson Manufacturing Co., Los Angeles, Calif., during the last year has been developing new and improved products in sucker rods, pumps, pump fittings, etc. Among them are the following:

Axelson Super-Service liner insert pumps, built to deliver efficient production under the most severe conditions that an oil well pump must endure. The metal and metal principle characteristic of Axelson pumps is maintained. The hardened liners and hardened ring plungers make possible a pump of unusual durability.

Grooved and seal insert pumps, based upon the metal and metal principle, offer service for average well conditions at an initial cost less than that of the liner insert pumps.

Four-way heavy duty top and bottom cages, box and pin types, heat-treated to withstand severe service; designed to allow one thirty-second inch clearance for standard A.P.I. ball.

Axelson grooved plungers. The addition of circumferential grooves on the surface of the steel plungers increases the efficiency of the sealing action due to the turbulence of the fluid setup in the grooves. This allows the use of a looser fit plunger with corresponding reduction of friction. Any sand that may be present is diverted to the grooves, thus protecting the working surface of the plunger and liners.

Axloy seats and balls, made from rustless, seamless steel. A special composition of material, together with polished finish, furnishes maximum resistance to corrosion. They may be had in either convex or concave design.

Axloy seats and drops, designed for long, efficient valve lift. The polished surfaces of the stainless corrosion resisting steel assure maximum resistance to destructive factors.

Hardened cast-iron liners, produced from a special mixture of chromium, nickel alloy and cast iron and processed through a series of specialized hard treatments to give closer grained structure with increased surface hardness.

Axelson is now manufacturing two types of sucker rods, the Axelson Standard No. 55, made in both double and single joint. These rods are made from the highest grade electric furnace steel available, held to close commercial tolerances as a uniformity.

GOBLE NO. 6 IMPROVED UNDERPULL JACK—Weight 3,600 pounds. Economical for East Texas. ONE BEARING—OIL ONCE A YEAR.

LIFTS LOAD EASIER than any other jack ever made. $500 to the engineer that can match our lift. Straight lift and you pull 2 cotter-pins to pull well. Headache posts may save you expensive fishing jobs. Adjustable side and end ways. Head slips back for pulling by removing 2 bolts.

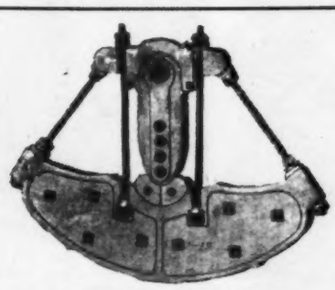
RAIN-PROOF OIL-BATH BEARING, replacing D-stirrups for multipliers, holdups, hold-downs, etc.

This bearing has sediment basin for cuttings to settle into away from bearing surfaces.

Oil a few times a year.

We also have the vertical bearing for swing on same idea.

Our three bearings in a line give a saving of power over D-stirrup.



GOBLE COUNTERBALANCE

Will Fit Your Old Crank and Is Interchangeable.

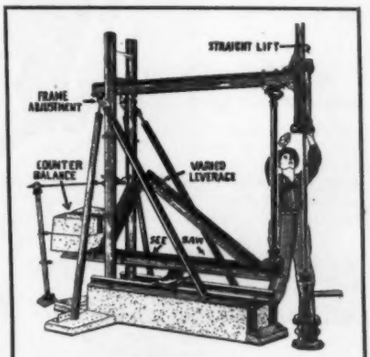
To change to crank of different shape run babbitt between top and bottom castings and crank.

CHEAPER as it is easier made.

SAFER as you need not move on blocking when detaching.

Our ¾-ball washers and combination of other washers give a truss construction and wind-bracing others do not have, and at a less price. Side-bolts may be put on compression, relieving strain on castings and forming a rigid truss.

Complete—ready to attach—2100 lbs. $180.00. Extra weights, $4.40 a cwt. Discounts on quantities.



GOBLE NO. 6 OVERPULL JACK is champion heavyweight of the world; 3100 lbs. VARIED AND CONTROLLED LEVERAGE ON A SEE-SAW ROCKER.

One company has 350 of this model.

Our Varied Leverage and about 2,000 pounds of cement counterweight is the cheapest power you can buy.

VARIED AND CONTROLLED LEVERAGE ON A SEE-SAW ROCKER is the greatest invention that has come out of the patent office since they began to pump wells. We will demonstrate anywhere in the Midcontinent our way compared to lifting the load on different style *bell-crank jacks* by actually lifting the load on scale. Any Superintendent or Engineer can very easily see how we lift the load easier.

We spent $10,000 lifting loads on scale before discovering Varied and Controlled Leverage; you can know all about it by dropping us a card.

THE OLD BOYS PUMPED WELLS ON A bell-crank pumping jack long before the bicycle, many years before the horseless carriage and automobile, and fifty years before men began to think they could fly. WHY NOT PUMP YOUR WELLS THE MODERN WAY?

Five months ago we replaced a bell-crank jack on a lease where they were running 20 and 22 motion and whipping everything to pieces. Now they have all the weights off of the governor and are resting leases six hours a day. Verified by letter from owner.

B. G. GOBLE MFG. CO.

TULSA, OKLAHOMA

Explosion-proof

Here's a four cylinder, slow speed, conservatively rated gas engine for pumping. Waukesha engineered . . . with a water cooled exhaust manifold and a completely sealed ignition system . . . it is explosion proof. And note these features — valve-in-head with removable valve seats . . . wet cylinder sleeves, removable . . . extra heavy flywheel . . . oil type air cleaner . . . gas regulator . . . triple size clutch . . . entire unit self lubricated. *Waukesha Motor Company, Waukesha, Wisconsin.*

AT THE
CENTURY OF PROGRESS
INTERNATIONAL EXPOSITION
CHICAGO
Don't fail to visit the Waukesha exhibit—Travel and Transport Building, Section C, Group 16, Spaces C and D.

WAUKESHA ENGINES

Oilbath Geared Power Is Offered as Trouble-Free

The Oil Well Supply Co. has developed a new line of field-proven pumping equipment especially suited for the requirements of the East Texas Field. Among them is the Imperial No. 80-SC (single dual-stroke crank) oilbath geared power.

This power is a compact, fully enclosed oilbath unit offered for continuous trouble-free pumping of a number of deep

wells. Its horsepower input capacity is conservatively rated for oil field service 80 horsepower at 20 S.P.M. or 115 horsepower at 30 S.P.M.

The crank and main gear revolve as a unit around the sturdy spindle which is cast integral with the rugged, well-reinforced, semisteel base, and the thrust is transmitted directly to the base. No excessively heavy cover is necessary as it is not required to support the thrust or any other load from the overhung crank. The stationary-spindle design permits a wide bearing spacing, for properly supporting the overhung crank, with minimum overall height. The pull-rod connections are close to the foundation. This, with compactness of the unit, results in low installation costs and high mechanical efficiency.

The double-reduction gears are the same as those which have been proved in the No. 80 (eccentric type) powers and are properly heat-treated for maximum wear resistance and strength. Timken heavy-duty roller bearings, used exclusively, have been selected by Timken and "Oilwell" engineers for their particular applications.

The cast-steel crank is of the exclusive "Oilwell" dual-stroke type with two crankpin holes. The crankpin is placed in one for a 30-inch stroke and in the other for a 36-inch stroke. The pull-rod strap disc has 16 clevis holes, each provided with a hardened steel bushing. The clevis pins are drilled for Alemite lubrication. The lubrication system is simple and positive.

The Imperial No. 80-SC power can be driven by a gas, gasoline or oil engine or by an electric motor. Other "Oilwell" oilbath geared powers especially adapted to the East Texas Field are the Imperial No. 80 and the Imperial No. 150-SC. Hhe No. 80 is an eccentric (single or double) type unit and is recommended for the same service as the No. 80-SC. The No. 150-SC is a single dual-stroke crank power for trouble-free and efficient performance with heavy loads. The general design is similar to that of the No. 80-SC. Its horsepower input capacity is conservatively rated for oil field service, 150 horsepower at 20 S.P.M.

New Type Counterbalance Developed by Parkersburg

The Type C counterbalance put on the market by the Parkersburg Rig & Reel Co., Parkersburg, W. Va., has features which should engage the interest of oil operators. The crank is cast of high-test iron. Across its back is a tapered tongue which fits with a corresponding groove in the main weight. This tongue and groove construction is designed to assure perfect alignment and carries all the weight and centrifugal force.

All the torque of the weights is transmitted to the crank through two driving ears at the bottom of the crank and fitting into corresponding recesses in the main weight.

Three large bolts tie the crank and main weight together. These bolts carry none of the load although any one would be ample in size to do so. In addition, two turnbuckle rods used in the mounting and demounting operation serve as additional supports for the weight.

The additional weights as required are attached to the main weight in the same manner that the main weight is attached to the crank, and this construction is said to assure safe and trouble-free operation.

The soundness of this design is reported to have been proved by use in the field and by tests in the factory in which the counterbalance was subject to loads and strains far in excess of anything experienced in pumping and run for long periods of time without developing any weakness.

The M&V Type H low pressure treating and separator tank introduced by Parkersburg separates oil, gas and water and treats bad oil, getting full recovery from b.s. It is compact and, according to the manufacturer, foolproof.

Foxboro Introduces New Auxiliary Control Device

Addition of the Deoscillator, a new auxiliary device developed by the Foxboro Co., Foxboro, Mass., makes it possible to get anticipatory control action with any pyrometer controller. This anticipating action improves control operation by eliminating "hunting" or overcontrolling.

The Deoscillator is "cut in" between the thermocouple and the controller. In operation the instrument impresses into the thermocouple circuit a slight additional e.m.f. that augments the thermocouple e.m.f. when the temperature is low and opposes it when the temperature is high. This causes the controller to close either the high or low circuit a little ahead of the actual temperature demand. The anticipatory effect prevents excessive overrun or underrun of the desired temperature.

Adjustment to the requirements of the particular heating equipment on which the Deoscillator is installed is quickly and easily made. Once the instrument is set correctly, that setting will hold for practically any condition from no load to full load. The Foxboro Co. has prepared a preliminary description of the Deoscillator which may be had on request.

Accident Guarded Against by Every-Ready Protector

Every oil field worker is familiar with the picture of buckled tubing that is made useless by accidents while the tubing is in the well or when it is being run or pulled. Once the tubing gets loose there is no stopping it until it strikes the bottom of the well, unless the tubing is protected against this very thing.

The Smith Every-Ready protector, made by the Smith Separator Co., Tulsa, has done much to overcome the hazardous undertaking of tubing wells. With it the oil producer is afforded protection at all times for the life of the well. Through the development of this device the tubing is said by the manufacturer to be as safe while being installed in the well or being withdrawn as it would be on a rack in the mill. The tubing is protected under all conditions, without sacrificing any speed in running. This is said to have been proven in various oil fields throughout the world. The speed is accomplished by improving the design so that oil, water, gas, or a combination of them, or undue vibration of a string of tubing does not retard the lowering of the Smith Every-Ready protector.

An exclusive safety device on the Smith Every-Ready protector is designed to give the operator absolute control of the degree of drop or fall he wishes tubing to have, because if tubing is turned to where the device is to be anchored, it then can be set so that the tubing can have a drop of only 1 inch or up to 5 inches.

Weighing Wells Necessary to Get Highest Efficiency

Weighing wells to determine rod and equipment loads is a necessity where highest pumping efficiency is to be obtained. The pump dynamometer, comprising a hydraulic lever-type scales, can be applied to a pumping well in two minutes time, and will give an indicator card of the pump action, showing directly the rod load at every portion of the pumping stroke. It is a simple matter to run the

instrument and read the basic factors from the card. With this information and the production data it requires only a few minutes figuring to obtain separately the efficiency of the mechanical pumping equipment, "wires to rods," and of the pump and rods, "below ground." Determination of these figures enables the setting of proper speeds and strokes, and installation of proper type and weight of counterbalances both for maximum power efficiency and for minimum rod loads.

In the installation of new equipment, the pump dynamometer is particularly valuable. Through the testing of a few units, it is possible to predetermine with reasonable accuracy, maximum load requirements for similar wells under maximum possible production conditions.

This instrument, manufactured by the Martin-Decker Corp., Long Beach, Calif., has been proven by years of constant service, and is built to measure pumping loads of the deepest wells.

The pull rod dynamometer, for obtaining pumping power loads at any point in the rod line, is manufactured by the same company.

Hopper Machine Announces New Hoist and Drawworks

A portable hoist and drawworks designed for heavy duty and general application in repair work and well servicing has been announced by the Hopper Machine Works, Inc., Bakersfield, Calif. This new machine, designated as the Type "G," has sand reel and rotary table drive attachments that make it a complete rotary drilling outfit combined with maximum portability, according to the manufacturer.

Mounted on a Caterpillar tractor, it has the feature of a complete control of all operations from one position on a platform situated at the rear of the tractor. All levers for the operation of both the hoist and all its accessories as well as the engine are within reach of the person handling the machine.

The drawworks is mounted over the center of the tractor, which distributes the weight evenly on the tracks. With the common center of gravity, no anchor to the ground is needed, no counterbalance is required to make it ride level, and the machine will not upset on the steepest hill, the manufacturer states. The drawworks is of all steel construction; all shafts are of chrome steel; all gears are alloy steel and machine cut; and all bearings are of the roller type with hardened inner and outer sleeves. It has six speeds forward and two reverse.

Pumping Stations Run by Automatic Pump Control

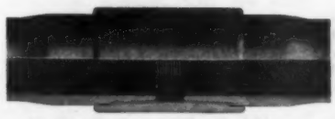
The EC&M automatic pump control, made by the Electric Controller & Manufacturing Co., Woodland and Buckeye Roads, Cleveland, Ohio, provides automatic control of an elevated tank supplying water for a compressor station, pipe line pumping station or other purpose. Hundreds of pumping stations, according to the company, are being operated solely by these automatic pump controls. Some of them use deep-well pumps, others booster pumps. The demand determines their operation. They function only when needed and only so long as required to fill the demand.

A typical pump house contains four vertical motor-driven pumps. Two are deep-well pumps discharging into a clear well. The other two boost the water from here to a tank a mile away. The EC&M altitude regulator panel has all connections, both hydraulic and electric, made within the pump house. There are no pilot lines or control wires running to the tank. This ultra-sensitive unit starts and stops the pumps automatically in accordance with the levels in the tanks. An effective storage capacity is guaranteed at all times by extremely close regulation. Bulletin 1,100-A, which contains information concerning the EC&M automatic pump control, may be obtained by writing to the company.

J&L Oil Field Goods Made Under Exacting Conditions

J&L A.P.I. standard plain wall tubing and J&L A.P.I. standard external upset tubing, illustrated here, are produced in the Jones & Laughlin mills, Pittsburgh, Pa., under extremely exacting conditions. Critical inspections and tests during every

J&L A.P.I. standard plain wall tubing



J&L A.P.I. standard external upset tubing

stage of manufacture insure uniformly high quality of these products. J&L A.P.I. standard plain wall tubing and J&L A. P.I. standard external upset tubing are manufactured in complete ranges of sizes.

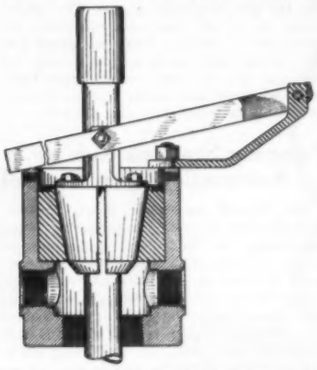
Other J&L oil country tubular products include casing, drive pipe, drill pipe and line pipe, lapwelded and seamless, all of which are made in complete ranges of sizes.

Thorough inspections and rigid tests are made during manufacture, and all J&L oil country tubular goods are designated to give trouble-free service in the field, both in installation and during operation.

J&L also manufacture hot-rolled seamless steel boiler tubes, standard pipe in black and galvanized and copper steel pipe in black and galvanized.

Alten Casinghead Unites Three Appliances in One

The triple-duty casinghead made by Alten's Foundry & Machine Works, Lancaster, Ohio, is, as its name indicates, a combination tubing hanger, tubing spider and gas-tight casinghead. It can be used in cleaning out, using the regular pattern oil savers. The clearance in this head



is the same as the inside diameter of the casing on which it is used.

The tubing is run on the slips as shown in the illustration. When the tubing is in the desired position the spider attachments are detached from the top of the head, leaving the slips in position as shown. This allows the head to act as a tubing hanger. With the removal of the spider attachments the packing glands and rubber packing are placed in the head secured by four steel bolts, this making a gas-tight arrangement.

Deep-Well Pumps Added to Pacific Line of Products

Deep well oil pumps have been added to the line of products offered by the Pacific Pump Works, Huntington Park, Calif. The Mid-Continent Pump Supply Co., a subsidiary established in Tulsa, carries a full supply of liner pumps and renewal parts, and is equipped for service, including the regrinding of plungers and liners. The Mid-Continent Pump Supply Co. is headed by Roy A. Dunbar.

In announcing the oil well pump line, George E. Bigelow, general manager of the Pacific Pump Works, says that the insert liner pump, wherever it can be used, is an efficient and reliable pump for the pumping of oil from deep wells, and that with an efficient regrinding service, oil production costs are materially reduced.

Ralph Van Matre is in charge of oil well pump sales for California. Frank Hudson is in charge of manufacture and Jim Edwards is in charge of the assembly department. These men have had years of experience and are well known in the industry.

There are four bulletins describing the various types of Pacific liner pumps in detail, which will be mailed to anyone writing the Pacific Pump Works, Huntington Park, Calif., or the Mid-Continent Pump Supply Co., Tulsa.

Lane-Wells "Ring" Packer Designed to Conserve Gas

Production men in East Texas are realizing the vital importance of conserving the natural gas for the purpose of flowing their wells just as long as possible.

The Lane-Wells "ring type" packer is designed for such installations. The annular space between tubing and casing can be easily and positively sealed off, permitting efficient flowing through tubing of sufficient size to minimize back-pressure and reduce friction losses, but small enough to gain the velocity required to prevent the gas from separating and by-passing without lifting the oil.

One of the important features of this packer is the use of five packing rings of graphite-treated fabric over a rubber core, which permit setting and resetting without danger of sticking or vulcanizing to the casing. Although providing a leak-proof, uniform seal-off, these packing rings release readily, even after being set for four years under severe temperature conditions.

From the special top collar, which permits running on tubing, drill pipe or casing, to the tempered anchor springs, the Lane-Wells packer is engineered to avoid packer troubles.

A series of metal rings serves to expand the sealing rings described without directing any pressure inward against the body. A circulation area between the packing assembly and the body insures maximum speed while running in or coming out of the hole.

Other features of operation and construction are described and illustrated in a folder which will be forwarded upon request to the manufacturers at 4439 Santa Fe Avenue, Los Angeles, Calif.

"Separafine" Designed to Solve Paraffin Troubles

Separafine, made by the Separafine Manufacturing Co., Bristow, Okla., is designed to relieve producing and refining operators in East Texas by solving paraffin troubles. Even with a low price of crude Separafine is in demand for the removal of paraffin from tubing, casing, flow lines and tank bottoms. In some east side wells gas pressure is low and oil flow is insufficient to flush the tubing, in which case paraffin hardens and in many cases completely plugs the well. Running of bottom-hole pressure instruments has revealed paraffin in all parts of the field. Frequently the instrument cannot be lowered without scraping or treating the paraffin.

Separafine has proved successful in dissolving paraffin in plugged and partly plugged wells. Accumulated paraffin in tank bottoms may be liquefied by Separafine. The saving of back gauge oil is important and the hazardous labor of entering and scraping the tank is eliminated. Several refineries maintaining gathering systems use Separafine in a practical way to treat paraffin from the gathering lines. This product is sold through Separafine Chemical Sales, Kilgore, Tex.

Texas Steel Adds Line of Equipment for Deep Wells

The Texas Steel Co., Fort Worth, Tex., has added to its products for the oil fields a complete line of deep well equipment. The line includes a newly designed underpull pump jack of modern construction. All rigid joints are arc-welded. The only two flexible joints are equipped with a dual lubricating system for alemite and oil.

The pump jack is bolted to a concrete foundation, with U bolts, which have the effect of giving double anchorage strength. The bolts are so located at points of greatest stress that distortion under severe loads is impossible. The horsehead has been simplified to eliminate unnecessary bearings and to provide a straight lift for the length of the jack's unusually long stroke.

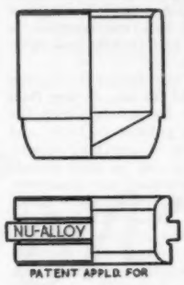
The double channel vertical member, to which the rod line bearing is attached, is arc-welded to the beam, and diagonally braced with a heavy pipe to the horsehead. To the beam assembly is bolted a saddle, mounted in a housing on top of the jack frame.

In line with this pump jack are other new Texas Steel Co. products. One is a heavier swing of arc-welded construction. The rod line connections have bearings with removable bronze bushings, and are equipped for both alemite and oil lubrication. This swing is designed so that shearing strains are eliminated and all members are in either tension or compression only.

One well or two-well backside crank assemblies are also new additions. The stroke posts with these assemblies are of new design, and have bronze bushed bearings, which insure longer wear, smooth performance and ease of replacement. In conjunction with this assembly, but sold separately, is a new design knockoff assembly of marked simplicity and efficiency.

Nu-Alloy Balls and Seats Have Extremely Long Life

The Petroleum Equipment Co. of Fort Worth, Tex., has introduced a new ball end drop and seat, made from Nu-Alloy noncorrosive steel, which tests are said to have shown have exceptionally long life.



The ball end design of the drop is said to stream line the passage of the fluid, instead of creating turbulence, with a flat or open end, under the most severe pumping conditions.

The development of the Nu-Alloy drop and seat has to do with the development of bearings. The introduction of ball bearings revolutionized the bearing industry. To eliminate spot contact and the resulting wear of the raceways in one place, the roller bearing was designed, which contacted the entire length of the raceway.

The action of a ball in a valve crown in its opening and closing motion is to find a bearing, which it does in the form of a spot contact. This contact delivered with considerable impact, together with the velocity of the ball, is very destructive to the rings of the crown, and quite often they are battered out in a short time. In the drop and seat, the drop is perfectly balanced, the side wall contacts the wings of the crown the entire length of the drop, as in the bearing, and the resulting action is a smooth and exact opening and closing movement free from flutter, chatter and pound. The seating is effected by a broad seat which cushions the closing shock. The ball end of the drop is completely protected by the side wall, which projects slightly over the radius of the wall end.

Nu-Alloy drops and seats do not require the use of special crown equipment, but will operate in any type standard or A.P.I. crown.

One of the outstanding features of the ball end drop and seat is that it is possible for the manufacturing company to control the entire production in its own plant, and through the selection of steels, bronzes, and various alloys, to manufacture equipment to meet any corrosive or abrasive problem found in the pumping of oil. This is in line with the company's policy of furnishing pumping equipment to meet the individual requirements of the field where it is used.

New Type Oil Field Chain Introduced by Chain Belt

Rex Chabelco DW4 and DW3 chains, especially adapted for oil field use, are announced by the Chain Belt Co., Milwaukee, Wis. They are said to embody many refinements in oil field chains. The DW4 and DW3, with their accurately ground pins and bushings are smoother running, according to the manufacturer. The frames, made of high-grade alloys, are more powerful, the sidebars are full die cut and leave no surplus weight, two holes in the bushing allow the oil to work into the bearing areas and provide for positive lubrication.

New Type of Speedwinch Is Introduced by Wilson

A new series of super speedwinches which can be mounted on any of the large heavy-duty trucks, is announced by the Wilson Manufacturing Co., Wichita Falls, Tex. Though designed for the deepest wells, they are light in weight and easily portable over bad roads. They have large, smooth-acting, dual brakes 8 inches wide on 32-inch steel wheels with replaceable nickel iron brake rings. Brakes are fully equalized. The barrel is 13 inches in diameter and the drum regularly 40 inches wide between flanges. Ground or seat controls are provided. Timken self-aligning roller bearings in steel housings are used exclusively. The winch derives its power from a truck motor through a Wilson heavy-duty split-shaft power takeoff designed especially for this use.

The weight is centered approximately over the rear wheels, giving the proper distribution of weight on the truck and eliminating undue strain on the truck frame, front springs, etc. This gives greater traction on bad roads and permits anchoring direct to the derrick sills.

Two Grant Tools Made to Clean Well on Completion

In completing a well the operation of cleaning the formation of mud fluid and sediment to insure an unrestricted flow of oil or gas from the producing zone is said to be accomplished successfully with the Grant bailer and Grant perforation cleaner, recently added to the Grant line to provide the advantages of low-cost operation, dependability and long-time

Spent torpedo casing weighing 22 pounds, brought to the surface with a Grant bailer from a depth of more than 5,500 feet, at Signal Hill, Calif.

service. The principles embodied in the design and operation of the Grant bailer and Grant perforation cleaner are fundamental and scientific. Both tools take advantage of the natural hydrostatic pressure in the well for their operation.

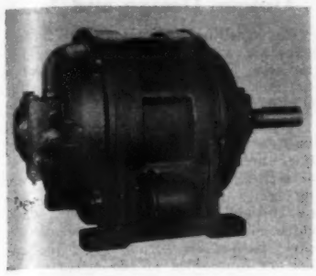
The loading chamber of the bailer is sealed by means of a small concave disc made of a hard brittle composition capable of withstanding increasing pressure, but instantly destroyed by the smashing impact of a plunger provided for the purpose. Breaking this seal allows the hydrostatic pressure of the well to force mud, milling, sand, pieces of junk and other debris into the loading chamber, filling the bailer instantly to its full capacity. A new disc each trip is said always to assure a perfect seal, and there is no time lost replacing cups or steel valves which have been cut by the sand.

The operation of the Grant perforation cleaner is similar to that of the bailer, except that the action is concentrated upon a limited area of perforations and the strong surging action set up through these perforations thoroughly cleans clogged formation in a way that is at once effective and quick. It literally forces mud, paraffin, sand, etc., out of the formation by its high velocity fluid action and through the perforations into the loading chamber.

The mechanical action of the Grant perforation cleaner is identical with that of the bailer, except that the sealing disc is broken by a tripping mechanism. Full details can be obtained by writing the Grant Oil Tool Co., 2042 East Vernon Avenue, Los Angeles, Calif.

G.E. Motor Adapted for Unusual Range of Loads

The double or triple-rated Y-Delta induction motor developed by General Electric Co. is particularly adaptable for pumping wells where power requirements are low but expected to increase as the gas pressure drops or when the allowable production is increased. This motor affords high efficiency and power factor



Typical of double-and triple-rated constant-speed General Electric induction motors (type K.)

over a wide range of pumping loads, an advantage which usually results in material savings in power bills. In initial pumping operations the low rating of the motor is used. When the load increases beyond the capacity of this rating the next higher rating is employed and eventually, at full production, the highest rating will be required. The highest rating can also be used for operating a production hoist of the friction-clutch type.

The Y-Delta motor can be used to advantage on a lease or group of leases where there is a wide difference in power requirements for the pumping of the various wells. One size of motor can be selected for service under such conditions and the low rating employed for pumping the light wells while the higher ratings can be used for the heavier wells. This provides flexibility which is desirable when wells are abandoned or new ones brought in and it simplifies the problem of spare motors and renewal parts.

In cases where the required starting torque cannot be developed on the low rating of the Y-Delta motor, the motor may be started on the high rating and then switched to the lower rating after reaching full speed.

The two or three different ratings for each motor are obtained by means of special connections brought out from the motor winding. Either of two ratings may be selected by means of a double-throw switch and the third rating by use of a second switch, or, as is the usual practice, by changing connections at the motor terminal board.

The Y-Delta motors are usually furnished in the constant-speed, squirrel-cage type. They are available as open motors, gear motors, splash-proof motors and totally-enclosed motors. The last-named can be made weather-proof, if desired. The squirrel-cage motors are started at full voltage by means of a simple control unit, available in either a dust-proof or weather-proof case.

The General Electric line of Y-Delta motors operate at the same synchronous speed on all ratings. In most cases this speed is 900 or 1,200 r.p.m. Typical triple ratings are 40-25-15 horsepower and 25-15-9 horsepower. Various other sizes are available for service under practically any pumping conditions.

Flexco Fastener Answers Oil Field Belt Problems

Flexco deep-well belt fastener and Alligator steel belt lacing for machinery belting, both manufactured by the Flexible Steel Lacing Co., 4607-31 Lexington Street, Chicago, have gained wide favor in the oil industry.

As wells go deeper, the fastener has an increasingly heavy load to carry. The Flexco deep-well belt fastener is offered as the answer to the serious problem of reliable belt joining.

Each plate consists of an inner and outer section. The outer section is made of heavy gauge steel, die-formed and hardened to give reinforced rigidity. This section is spot welded to the inner section, providing maximum strength with a minimum of weight. Plates, bolts and nuts are rust proofed. Testing up to 20,000 pounds on 12-inch A.P.I. specification belting, this fastener actually combines strength and light weight, producing a durable, dependable joint for the most severe service.

The lugs on the inner faces of the plates engage the belt and prevent the belt ends from working out of the fastener.

The large generously curved flanges of the inner sections reduce friction in the belt ends between the plies, thus helping to prevent ply separation, so common where sharp corners and narrow flanges are used.

The Alligator steel belt lacing is quickly and easily applied, only a hammer being needed. All teeth are clinched and the lacing is flattened, giving a strong, smooth, separable joint.

Discussion of Colloidal Iron Oxide Presented in Bulletin

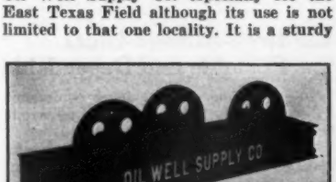
Characteristics of colloidal iron oxide are described in a 16-page bulletin obtainable from the George S. Mepham Co., East St. Louis, Ill., manufacturer of Colox, a mud-conditioning material, or from the C. K. Williams Co., Shellmound Park, Emeryville, Calif., which manufactures and distributes Colox in the Pacific Coast area. The bulletin, sent to drilling contractors and oil operators on request, contains valuable tables also. It gives details of the manufacture of iron oxide and discusses methods of mixing, proper volume and proportions to use and offers much other valuable data for contractors and operators.

Engineers have developed a chart included in the bulletin showing the comparative fluidity and pumpability of Colox in relation to muds made up of several exceptionally good field clays.

Methods of calculating mud content, determining specific gravity, how to increase the weight of drilling mud with iron oxide, how to increase the weight of drilling mud by adding clay per cubic foot and per gallon, also the relation between specific gravity, mud weights and pressure head, are presented in mathematical and table form. A large list of convenient equivalents and conversions is shown.

Crown Block Designed for Conditions in East Texas

The new "Oilwell" Type 33 tubing crown block has been developed by the Oil Well Supply Co. especially for the East Texas Field although its use is not limited to that one locality. It is a sturdy

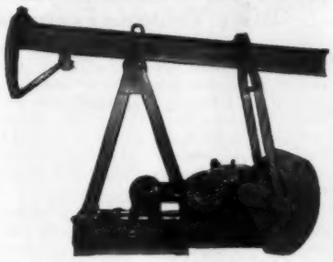


block, is designed for long life, maximum convenience and trouble-free performance. It is regularly furnished with three beams and three sheaves, as illustrated, three beams and two sheaves or two beams and two sheaves. A beam can be easily added or removed in the field, and the bearing housings are clamped in place so that the sheaves can be readily shifted to any desired position even after the block is set up in the derrick.

The beams are strong structural-steel I-sections. Ten-inch beams are furnished for handling the heaviest loads with a wide margin of safety. Eight-inch beams are furnished for lighter service. The sheaves are 22-inch outside diameter.

Complete Line of Geared Pumping Units Developed

The International Derrick & Equipment Co., Columbus, Ohio, has developed a complete line of geared pumping units especially adapted for East Texas. These units are available in single or double reduction type, and have capacities from 15 to 100 horsepower. The lighter units are used at individual wells. The heavier



units are often employed in multiwell pumping service.

The unit illustrated has become well known in the East Texas Field for individual well service. It is equipped with twin cranks and twin counterbalances, which give an equal distribution of stresses on both sides of the machine. It is mounted on a structural steel bedplate, and is furnished complete with V-belts and pulleys, double pitman having spherical wrist pin bearings, pitman oscillator, steel walking beam with mule head, and steel samson post with a lead screw for retracting the beam from the well during servicing operations.

All "Ideco" units are equipped with roller bearings throughout. Accurately cut, continuous-tooth herringbone gears are standard equipment. The shafts are made of nickel chrome steel forgings, heat-treated. The gear case is of cast semisteel, of extra heavy ribbed construction. The gears operate in a bath of oil, which is circulated continuously through each bearing by a positive system.

Back Side Crank Pumping Unit Developed by Ofeco

The Ofeco back side crank pumping unit, designed by the Oil Field Engineering Corp., Fort Worth, Tex., is designed to be of special value to line wells where a central power is not practical. One well, under this method, can be standardized and from two to four additional wells balanced, all on the Ofeco unit. Addition of these extra wells is figured, from field tests, to add little cost over that of the original well.

The Ofeco unit has a capacity of handling 4,000-foot wells. It is made entirely of steel. All moving parts are bronze-bushed with tooled steel connection pins. All parts are oversized and ruggedly built to last the life of the well. Replacement pins and bushing may be quickly installed without shut down of the wells.

The Ofeco back side crank pumping unit incorporates the Ofeco Wilcox wrist-pin in connection with its assembly.

Moore Kay Derricks Unite Simplicity and Efficiency

The Moore Kay derrick, manufactured by Lee C. Moore & Co., Pittsburgh, Pa., is said to represent an important advance in derrick construction. The simplicity and the efficiency of its design provide exceptional strength, and assure unusual economies. Moore Kay derricks are furnished with either tubular or angle legs in all A.P.I. heights and sizes. They conform with A.P.I. specifications and carry the A.P.I. name plate.

Complete standard pumping rig fronts are furnished with several different types of samson posts, a rigid A-frame construction with either a sloping or vertical front leg to permit installation where a drawworks hoist is used, and a three-legged A-frame type suitable for heavy service. Walking beams are made with several different combinations of ends, standard, underslung or three point in line. The beams are made of silicon or mild steel in lengths from 23 to 28 feet. A complete line of improved dustproof oilbath rig iron bearing is a feature. Beam hangers can be furnished with either roller, babbitted or bronze-bushed oilbath bearings. The steel pitman is adjustable for alignment and wear. Steel face band wheels in all A.P.I. sizes and a complete line of reduction gears, with counterweights and brakes are available.

Portable Power and Light Generator Has Many Uses

The Aladdin "Little Giant" portable generator is announced by Heintz & Kaufman, South San Francisco, Calif., as adapted for general utility and emergency use in location work, field and station operation and pipe line laying and maintenance. The generator, which is 10x12x14 inches overall and weighs 35 pounds, develops 350 watts at 350 cycles and will operate any universal or D.C. 110-volt motor up to one-fourth horsepower, according to the manufacturer.

The generator, according to the manufacturer, powers ten 40-watt bulbs, equivalent number of larger or smaller lights, Sperry searchlight, arc light, floodlight, field wireless, or signal systems. It operates pumps, portable chippers, saws, drills, hammers, soldering irons, locating tools and other appliances. Three to five hours run on 1 gallon of gasoline is claimed for it.

Air-Operated Sump Pump Has Wide Range of Uses

A wide range of uses in the oil industry, public utility and other fields is offered by the portable air-operated sump pump introduced by the Ingersoll-Rand Co., 11 Broadway, New York. An open-impeller type centrifugal pump is driven by a "multivane" type air motor and both are enclosed in a one-piece housing. The

unit weighs 50 pounds, and is designated as sump pump size 25.

Typical uses are pumping from sumps, tanks, trenches, manholes, caissons, cofferdams, etc. The pump will handle clear or dirty water, oil sewage, or moderately heavy sludge. Materials used are suited to the services and include bronze, stainless steel and rust-proof steel for installations that require them.

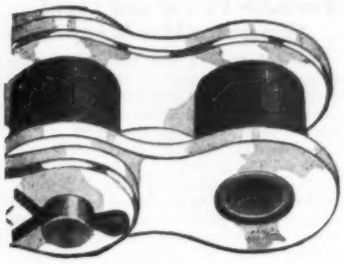
The pump is intended for lifts of 10 to 40 feet with air pressure of 70 to 90 pounds, but will give satisfactory results under widely varying conditions of head and air pressure. Using air at 80 pounds pressure, the capacity ranges from 170 g.p.m. with 10-foot lift through 20 feet of 2½-inch hose to 125 g.p.m. with 40-foot lift through 50 feet of 2½-inch hose.

The company has developed also a new portable air compressor which adapts advantages of two-stage stationary compressors and makes them usable in portable units for the first time. These improvements give the new compressor economies and efficiencies. Tests show that, size for size, the new compressor will deliver 23 per cent more compressed air than previous Ingersoll-Rand models. It will produce an equal volume of air with 25 per cent less fuel.

Link-Belt Puts Improved Roller Chain on Market

The Link-Belt Co., Indianapolis, Ind., has put a new and improved roller chain on the market, the Link-Belt Silverlink. Its side bars are especially treated to assist in resisting corrosion, and this treatment gives them the appearance of silver.

Silverlink roller chain is made in all



sizes from three-eighths inch to 2½-inch pitch, and in single or multiple widths. It is available with wheels for any horsepower, also with conveying attachment links in wide variety; and complete drives are carried in stock by distributors in sizes up to 225 horsepower, in speed ratios of 1 to 1 up to 8 to 1.

Construction features of Silverlink chain are enumerated as follows: (1) Side bars of alloy rolled steel heat-treated for strength and toughness, and especially treated to resist corrosion, thereby prolonging the chain's life. (2) Nickel steel case-hardened pins, detachable type with cotter, or furnished riveted. (3) Solid steel case-hardened bushings. (4) Alloy steel heat-treated rollers. The Link-Belt curled roller is made from strip steel having a strong fibrous structure, with the fiber running around instead of across the roller, so as to give the greatest strength and resilience to the roller (where the greatest wear takes place), and offer the maximum resistance to shock. (5) Uniformity and close clearances throughout to assure accuracy of pitch and smooth chain operation.

The company has developed also a new flexible coupling in which the Silverlink roller chain will be used.

Skill and Fine Materials in Auer Leather Products

Leather packings, valve cups, pump cups, discs, standing valve rings, casing cups, gaskets and valve leathers are among leather products for the oil industry made by C. L. and W. W. Auer, Corry, Pa.

Seep leather valve and pump cups are made from the highest grade long-time tanned scoured oak leather which produces a long fiber especially finished for these cups. They are made from the choicest part of the hide of close, tight fiber, and are a hard cup, yet not so hard as to lose pliability to conform to the working barrel. These cups are made by hand-operated machines, carefully centered, turned and dressed by skilled operators.

Star leather valve and pump cups are made of good grade of oak leather, but from a part of the hide which, while it is of long fiber, produces a cup which is somewhat softer than the Seep cup. They have the same careful workmanship used in the manufacture of the Seep cups.

Dry-pressed and dry pressed polished cups are of a much more open fiber and are used chiefly by the manufacturers of working barrels in their equipment.

C. L. & W. W. Auer are successors to C. A. Auer, manufacturer of hydraulic leather since 1882 and of packings since 1910. The Auer family, both in this country and in Germany, has been for unbroken generations engaged in the leather business. Members of the firm include one man who was reared in the tannery business and who has thorough knowledge of leathers. Another member contributes a machinist's talent which has resulted in the development of improved methods in the manufacture of cups—methods that have made the Seep and Star leather cups standard equipment with many of the large producers of the East.

Production runs close to 1,000,000 pieces a year and the choicest leather produced in America is employed.

New Mission Pump Piston Offers Valuable Features

Valuable features, resulting from its scientific design, are embodied in the new pump piston developed by the Mission Manufacturing Co., 2416 Railroad Street, Houston, Tex. This piston, which has no heads or follow plates, is made of high carbon, heat-treated, block forged steel, permitting less metal and more rubber to be used.

According to the company's announcement the following advantages are obtained: (1) Lightness of weight, reducing drag on rods and liners, thus reducing the upkeep on these pump parts. (2) Scientific design for supporting the rubber allows the use of a very flexible and flowing rubber, giving a greater wiping surface, eliminating by-passing. (3) Replaceable rubbers quickly and easily changed. No nuts to loosen. No frozen threads to break. (4) Piston bodies practically permanent because protected by soft flowing rubber. (5) Great strength proven by many deep tests under high pressures.

The body of the piston is so constructed that a minimum quantity of metal is required to support a maximum quantity of rubber. This construction for supporting the rubber reduces the weight of the piston approximately one-half and it increases the efficiency of the piston under high pressures, cutting rod and liner upkeep. The greater wiping surface eliminates by-passing thereby lengthening the life of the pistons and liners. The method of holding the rubbers to the metal body makes it unnecessary to use heads and follow plates. Rubbers pass freely over the piston rod nuts.

"Duroline" Pipe Resists Severe Corrosive Agents

"Duroline" pipe, made by the National Tube Co., Pittsburgh, Pa., is reported to have proved satisfactorily resistant to salt water and hydrogen sulphide mixtures in actual field tests.

A line of 6-inch Duroline pipe has been in service for about 2½ years in a salt

water disposal system near Luling, Tex. This line handles about 1,000 bbls. per day of water containing a total of approximately 38,000 parts per 1,000,000 of sodium, magnesium and calcium chlorides, and about 500 parts per 1,000,000 of hydrogen sulphide. The line is installed in a low-lying sandy soil, its position causing it to be filled with salt water at all times regardless of the rate of flow. An inspection of this line after 1½ years' service, in which alternate lengths of the pipe were lifted, showed no deterioration of the lining and no tubercles had formed on the inside of the pipe.

In an East Texas oil refinery, 4-inch Duroline pipe was in good condition after 14 months' service on the transfer line of a clay cooker. During this time the cooker transferred into the pipe 133 times, each transfer involving 10,000 gallons of a mixture consisting of clay, sulphates of iron and aluminum, and dilute sulphuric acid of 4 to 7 per cent free acidity, at a temperature of 160° to 180° F.

Gathering lines of Duroline pipe installed four years ago near Casey, Ill., are still serviceable though operating under extremely corrosive conditions.

Years of Service Offered by Twin-Crank Unit Power

The "Oilwell" TC-20 twin-crank unit power, made by Oil Well Supply Co., is designed for trouble-free, efficient pumping of an individual well over a long period of years. The strong, 18-inch, CB-section walking beam is mounted on the sturdy, structural-steel, derrick-type sam-

son post which is welded to the rigid structural-steel base. Mounted also on the base is an oilbath, roller-bearing equipped Westinghouse-Nuttall TC-20 double-reduction gear unit with silent helical gears and twin counterbalanced cranks. It actuates the walking beam through two pitmans and a pitman equalizer. The bearings at top and bottom of each pitman are self-aligning, and the load is equalized on the two cranks at all times.

Each counterbalanced crank has 17 pockets, and lead weights are easily placed in these pockets to provide the necessary lag or lead for perfect counterbalancing of an individual well. Each crank has five wrist pin holes for 22½, 30, 37½, 45 and 52½-inch stroke. A handy, quick-acting brake is furnished on the high-speed shaft extension for stopping and holding the cranks in any desired position. An arc-type mule head or polished rod hanger with equalized cable suspension assures straight polished rod motion.

This unit power is designed for maximum convenience in servicing a well. The necessary clearance is provided by a few easy adjustments, and it is never necessary to move the unit from its location at the well.

The recommended maximum pumping speed is 28 strokes per minute, and speed changes are easily made with the V-belt drive. The recommended maximum polished rod load is conservatively placed at 14,000 pounds, A.P.I. specification.

All bearings are fully enclosed and weather proof. The wrist pin bearings are grease-packed, roller type, and the upper pitman bearings and saddle bearing are oilbath, bronze-bushed type.

Cardwell-Allsteel Units Portable and Dependable

In developing well-servicing equipment for East Texas fields, it became apparent that two types were essential:

1. As most well are flowing wells, the "pumpers" and wells requiring servicing were quite scattered. This called for equipment which afforded portability in high degree. To meet this need the Allsteel Products Manufacturing Co., Wichita, Kans., designed skid-type units of light weight, extreme ruggedness and ample power to handle rod and tubing jobs on any well.

2. In many districts roads are inadequate or lacking altogether. The question of rapid portability gave way to that of giving any portability possible. To meet this need the company adapted its skid-type units to tractor mounting and turned to the tractor engine for power. These units are so designed that they detract nothing from the ordinary capabilities of the tractor which at all times is available for road construction and maintenance, general drawbar work and which supplies a well-servicing unit that can be depended upon to get to any well, even though most disadvantageously situated.

Among the exclusive features which have been developed for Cardwell-Allsteel units are wedge-action brakes, the design of which includes free rolling on Timken taper bearings, internal lubrication of drum bearings and special alloy iron drum flanges.

Washington Separator Has Unique Design and Action

The Washington automatic oil and gas separator, with continuous centrifugal action, has been placed on the market by the Petroleum Iron Works Co., Beaumont, Tex.

Continuous centrifugal action of the fluid as it rotates between the outer and inner shell effects the primary separation, oil settling to the bottom and gas, with the light particles of oil entrapped, passing through the inner chamber, within which is an arrangement of continuous spiral baffles for scrubbing of the mixture on four sides of the rising column during its ascent. Gas then is passed through a series of funnels with spiral baffles effecting further separation of the oil particles as the mixture enters the third chamber still turbulent and rotating from its original impulse. Gases are passed through the mist eliminators at the top of one chamber into another chamber. Any remaining fine particles of light oil are precipitated in this chamber and the dry gas is forced down the gas outlet. Separate oil drain pipes extend from the chambers to a point below the oil level to prevent wet gas ascending through the drain pipes.

The cross sectional areas of chambers and passages through which gas passes are sufficiently greater than the cross sectional area of gas outlet line to insure against a differential pressure within the separator and subsequent siphoning of the oil into gas chambers.

Provision is made for cleaning the float cage inlet and outlet pipes and valves without removing liquid level controller, and also for cleaning sediment from the bottom of the separator.

General Electric Offers New Line of Gear Motors

A line of gear motors, well adapted to slow-motion or long-stroke pumping, has been developed by the General Electric Co. Although the pump is operated at only a few strokes per minute, it is desirable to use a normal-speed motor

for low initial cost and high operating economy. The gear motor consists of such a motor in combination with a built-in, internal, helical planetary-reduction gear. Compact construction, high efficiency, full horsepower rating at the output shaft, economy of installation and operation because of the self-contained unit, and simple design are some of the many features of these gear motors.

Gear motor efficiency is high because of the use of helical gearing and normal-speed motors. Ample factors of safety, adequate lubrication, and careful workmanship assure long life and smooth operation. Gear motors are available in sizes from one-sixth to 75 horsepower. Standard ratios give practically any desired speed in the range from 600 to 13 r.p.m. at the output shaft, and lower speeds can be furnished on special order.

Sturdy Pumping Jacks Are Easily Assembled in Field

The new "Oilwell" Nos. 12 and 16 pumping jacks, developed by the Oil Well Supply Co., are sturdy, arc-welded, structural-steel units for efficient, trouble-free performance on East Texas central power installations. They are of the underpull type with weatherproof, oilbath, bronze-

bushed bearings of ample dimensions for the most severe service.

One of the outstanding features is the ease with which they are assembled in the field. Each consists of four sections which are quickly and easily put together. They are readily adjusted to provide a wide range of polished-rod strokes to suit individual well conditions. Both sizes are furnished with either arc type or line type polished rod hangers.

Another feature is the ample clearance provided at the stuffing boxes. The recommended polished rod load capacity for the No. 12 jack is 12,000 pounds and for the No. 16 it is 16,000 pounds.

"Gotkool" Water Cans and Coolers Make for Comfort

Gotkool water cans and coolers, made by the H. P. Gott Manufacturing Co., Winfield, Kans., make for comfort among oil field workmen. The Gotkool water can after many years of satisfying service has become known as the standard water cooler of the oil fields. Its familiar blue and black label bearing the name "Gotkool" in red is to be seen on the highways, the derrick floors and beside the driver of heavy trucks laden with oil field equipment. They can be bought at leading supply stores everywhere.

The Gott water can is a well-built container made in 1½, 3, 5 and 10-gallon sizes that will keep water cool for long periods, protecting it from dust and dirt. Gotkool water cans have not only proven themselves timesavers, in always being located close to the men at work, saving unnecessary steps, but are an economical investment as well, because they prevent lost time and help keep men contented.

The Gott water cooler comes in 3, 5, 8, 10 and 20-gallon sizes. It is manufactured to the same high standard that has made Gotkool water cans known for quality and long life. It safeguards the purity of drinking water wherever men work, in the shops, store or factory.

Miller Device Is a Bailer or Sand Pump as Required

The Miller combination bailer and sand pump, made by the Miller Sand Pump Co., Sapulpa, Okla., is constructed so that it can be used as either a bailer or a sand pump. Four types of interchangeable bottoms are made for the pump; the sand bottom used when cleaning out with tools, the chisel bottom and star bottom used when cleaning out without tools, and the bailer bottom used when a common bailer is needed.

The wire line goes through the bail and babbitts to a wire line socket. This gives the wire line a direct connection with the plunger and eliminates the old-style rod coming out of the top of the tube.

The plunger is 18 inches long with one-sixteenth of an inch clearance in the tube. Eight water courses circle the hollow plunger so that when the plunger starts up in the tube the valve on top of the plunger will seat and the fluid will seal the space between the plunger and the tube creating an enormous suction.

When the sand pump is lowered into the hole the plunger is at the top of the tube but as soon as the sand pump reaches the bottom of the hole the hollow plunger sinks to the bottom of the tube by allowing slack in the wire line.

Seamless steel tubing, drop forgings, and alloy steel are used in making the Miller combination bailer and sand pump.

Lufkin Pumping Equipment to Meet Varying Problems

The East Texas Field presents a variety of pumping problems. Almost all of the extreme individual pumping problems of other fields will be found there. Paraffin, low pressures, salt water, swampy land and river bottom problems are common.

Engineers of the Lufkin Foundry & Machine Co., Lufkin, Tex., for the last two years have been developing equipment to meet these individual problems. A complete line of pumping equipment is now obtainable in both worm and herringbone gear units designed to meet all East Texas conditions. The line includes four sizes of worm gear units with 11 different types of hookups; 5 sizes of herringbone gear units with 17 different types of installations, exclusive of four types of herringbone gear self-contained portable derrick units, both single and double reduction herringbone gears; also units with two sizes each of worm and herringbone gear for central pumping powers with several sizes of well jacks, rod swings, multipliers, knockout posts, rod pendulum arms and rocker arms.

Units adaptable to any of several types of electric motors, multiple cylinder and single-cylinder gas engine drives and wells completely equipped with hoist for individual well service, or drives especially adapted for pumping purposes only when portable well service is used, are obtainable. The company, known for its oil well geared pumping equipment for the last 12 years, has announced its ability to give two hours delivery from factory to the center of the East Texas Field.

Davis Regulator Perfects Device to Protect Boiler

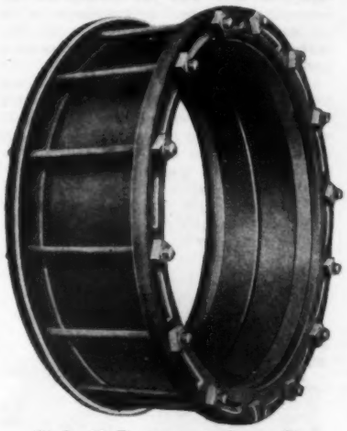
An automatic low-water fuel cutoff designed to meet insurance standards for gas-fired field boilers such as those used in drilling oil and gas wells has been developed by the Davis Regulator Co., Chicago. The device consists of a cast-steel float chamber, pilot valve, fuel shutoff valve and a whistle. The float chamber is connected to the steam and water spaces of the boiler. The diaphragm-operated fuel valve may be placed at any convenient point as it is closed by admission of steam pressure to the top of the diaphragm. The unit is designed to handle a maximum working steam pressure of 350 pounds.

When the water level in the boiler drops below a predetermined point the float will be carried down to a point where it opens the pilot valve. Steam flowing through the pilot valve builds up pressure over the diaphragm of the cut-off valve and forces it down. The downward movement of the diaphragm trips a latch and causes the main valve to close immediately. After closing, the main valve cannot be opened again until the latch is reset by hand. A whistle installed between the float chamber and the cut-out valve blows when the pilot valve opens.

Facilities for testing the unit at any time are provided by a three-way cock located in the water leg of the float chamber.

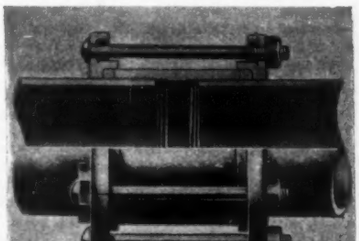
Dresser Accessories for Flow and Gathering Lines

Valuable accessories for the installation of flow lines and gathering lines in East Texas are Dresser couplings and Dresser collar leak clamps, made by the S. R. Dresser Manufacturing Co., Bradford,



Style 38 Dresser steel coupling

Pa. Lines constructed with Dresser couplings can be reclaimed and relaid quickly with practically no loss of material and with a minimum of time and effort. All of the Dresser products designed for the construction, operation and maintenance of pipe lines have rubber-packed joints, employing the well-known Dresser gasket principles. The popular style 38 steel couplings are available in all sizes from three-eighths inch up to the largest diameter of plain-end pipe produced.



Style 41 Dresser collar leak clamp

Dresser collar leak clamps, style 41, prevent or permanently repair leaks at ends of screw collars on steel pipe, size 4½-inch and up. Smaller pipe takes style 4 clamps of the same design.

Other modern types of construction and repair joints made by Dresser include: Style 53 cast coupling, made in sizes up to 30-inch; style 4½ horsepower bell joint clamp; new Dresser adjustable bell joint clamp style 60, and new style 57 split sleeves, which can be bolted end to end so as to repair pipe splits of any length in cast iron pipe.

Master Pumping Unit and Pumping Jack Introduced

Following its long established policy of not offering equipment to the petroleum industry until it has been thoroughly proven in the work for which intended, the Frick-Reid Supply Corp. has devoted many months in testing and checking the operation and performance of the new Frick-Reid Master pumping unit No. 1,154 and the Master pumping jack No. 54, before announcing them for sale.

In this new jack an almost perfect straight lift is obtained, the deviation from vertical motion being less than one-half of 1 per cent. Its slow easy starting lift assures longer life to all connected equipment and it is so designed that the rod load cannot drop on the stuffing box. Stroke adjustment is easily and quickly accomplished, the recommended stroke being 60-inch and maximum 72-inch. The jack will not wobble or crawl and by removing two bolts and loosening the connecting rod, 6-foot clearance can be obtained around the well head for pulling of rods or other well operations. Frame of jack is electric welded and with exception of bearing shells, nut retainers and bushing retainers which are of bronze, all castings used are of high grade electric steel. Ample lubrication is supplied by large grease reservoirs equipped with alemite fittings.

The Frick-Reid Master pumping unit No. 1,154 is of exceptionally sturdy construction and embraces exclusive features. The unit consists of the Frick-Reid Master jack connected to a carefully balanced counterweight and driven through a specially built Frick-Reid Ottumwa reduction gear equipped with single reduction gears of the herringbone type and designed especially for oil well pumping service. Drive is accomplished by four V-belts. Lubrication is accomplished by the splash and flood system. Total weight of unit is 5,000 pounds.

The prime mover is of particular interest as any single cylinder gas engine from 15 to 25 horsepower, when equipped with suitable sheave and clutch, is ample for handling the unit.

Pumping Equipment Suited to East Texas Conditions

The J. B. Beaird Corp., manufacturer of oil country equipment, Shreveport, La., since 1918, is entering the manufacture of pumping equipment suitable for use in East Texas and the Gulf Coast oil fields generally, according to J. B. Beaird, president.

"We have secured the services of S. B. Creamer, a graduate engineer with more than 10 years practical experience in Gulf Coast oil fields, who is in active charge of the design and construction of our new line of pumping equipment," Mr. Beaird said. "The line will include steel derricks, standard rigs, steel walking beams, rotary counterbalanced cranks and counterbalances, rig irons, band wheels, bull wheels, tubing hoists, pumping crown blocks, pumping jacks and other items.

"We operate steel, gray iron and brass foundries, a steel fabricating plant, a forge shop and a splendidly equipped machine shop in our plant at Shreveport, and are well equipped to meet the greatest demand for pumping equipment in the history of the oil business, rapidly developing in the East Texas area. Freight service to the field is excellent. Most of our orders will be filled direct from our Shreveport plant without unloading and reloading although we maintain warehouse facilities on the Longview-Gladewater highway in East Texas.

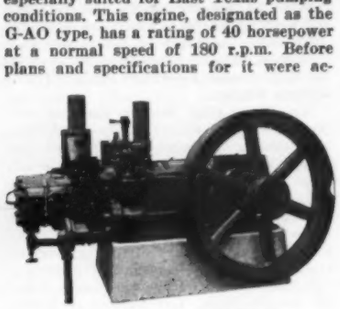
"Some idea of the capacity of our plant may be had from these figures: Approximately 10 acres devoted to manufacturing; steel yard covers 34,000 square feet; structural steel shop has 53,000 square feet of floor area; foundry and patterns, 21,000 square feet; machine shop and forge, 12,000 square feet; warehousing, 28,000 square feet; 2,900 feet of railroad trackage. We have a factory of unusual proportions, equipped with the most modern machinery."

Portable Drawworks Unit Has Features of Interest

A portable drawworks unit embodying features of interest to operators has been put on the market by the Portable Rig Co., Houston, Tex. Although it is ready to start drilling as it leaves the manufacturer's plant, it operates as standard drawworks, and is adaptable to any prime mover. The main frame is constructed and electrically welded in the shape of "A," with provisions for skidding in all four directions, and the drum is mounted on the base of the "A." Jackposts are inclined on an angle and welded to the base of the "A"-frame. Lineshaft and jackshaft are mounted on the jackpost. The two front braces are bolted from "A"-frame base to the jackpost, completing the "A"-frame, and to permit removal of drum without dismantling of the lineshaft, jackshaft or chains.

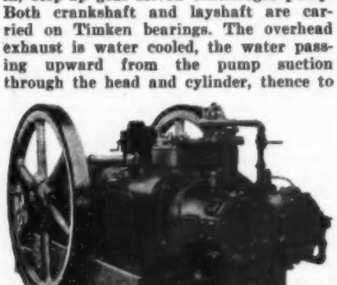
Cooper-Bessemer Pumping Engine Adapted to Needs

The Cooper-Bessemer Corp., Mount Vernon, Ohio, has designed a gas engine especially suited for East Texas pumping conditions. This engine, designated as the G-AO type, has a rating of 40 horsepower at a normal speed of 180 r.p.m. Before plans and specifications for it were accepted, they were passed upon by expert Diesel and gas engine engineers of national reputation.



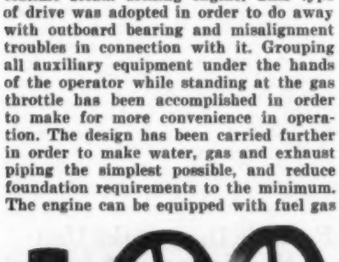
Type G-AO gas engine

This engine was designed along the lines of rugged simplicity. Departure from the conventional is seen in the adoption of single flywheel. Torsional stresses in the crankshaft, brought about by the reaction of one flywheel against the other, are eliminated. Other features are absence of outboard bearing, overhanging pulley drive, overhead exhaust, underslung layshaft driving all auxiliaries, including magneto or Wico for ignition, forced feed lubricator, enclosed governor and its built-in, step-up gear-driven centrifugal pump. Both crankshaft and layshaft are carried on Timken bearings. The overhead exhaust is water cooled, the water passing upward from the pump suction through the head and cylinder, thence to the circulating tank by way of the exhaust stool.



Type G-AW twin-cylinder gas engine

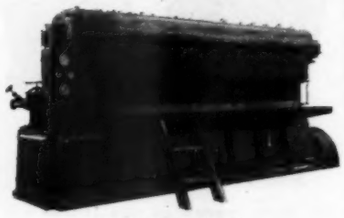
The single flywheel and drive pulley arrangement gives the appearance of an oldtime steam drilling engine. This type of drive was adopted in order to do away with outboard bearing and misalignment troubles in connection with it. Grouping all auxiliary equipment under the hands of the operator while standing at the gas throttle has been accomplished in order to make for more convenience in operation. The design has been carried further in order to make water, gas and exhaust piping the simplest possible, and reduce foundation requirements to the minimum. The engine can be equipped with fuel gas economizer for conserving fuel or can be readily converted to an oil engine at any time.



Type GF two-cycle full Diesel

With many of the East Texas operators looking to the larger geared and band wheel powers as the cheapest method of lifting their oil, Cooper-Bessemer is announcing a modern twin cylinder two-cycle engine for this job. It is a larger size of a model which has been tested over a two-year period. It has heavy-duty main roller bearings, a full box type main frame, a die forged crankshaft, a chain-driven roller bearing mounted layshaft from which the governor and rotary magneto are driven. It can be readily equipped with fuel gas economizer for conservation of fuel or converted to an oil engine at little expense. It is conservatively rated for the largest powers and is known as Type G-AW.

For more than a year oil producers have been cutting their power costs with a single-cylinder two-cycle full Diesel cold starting oil engine built by Cooper-Bessemer. The type is known as GF and is available in two sizes, 40 and 50 horsepower. These engines are being announced for any power job where natural gas is either not available or high in price. The engine is built with main roller bearings and a layshaft which drives the simplified airless injection fuel oil pump and forced feed lubricator.



Type JT Diesel

The new JT type Diesel has been making new operating records for two years. The engine pictured is one of seven recently shipped to the Atlantic Refining Co. for the oil line to the Gulf Coast. They were rated 380 horsepower at 400 revolutions and drive electric generators at constant speed. The electric power is used by motor-driven oil line pumps.

This type engine is also well adapted for use in central electric power generating plants that may be located upon leases for the purpose of generating electric power to drive individual motors at the different wells. Some operators are seriously considering the advantages of generating their own power in Diesel engine plants and the JT type Cooper-Bessemer Diesel direct connected to either A.C. or D.C. generator will prove suitable for this work.

Motor and Speed-Reducer Combined in Single Unit

The Louis Allis Co., Milwaukee, Wis., has introduced motorized speed reducers of high efficiency, capable of employing almost any type of motor. The motor and speed reducer are combined into a single compact, self-contained unit which makes an attractive, easily-mounted, slow-speed drive for many types of industrial machinery. Ratings available are three-quarters to 75 horsepower with output speeds 4 to 400 r.p.m.

Efficiencies as high as 97 per cent or more are made possible by simple design which reduces to a minimum the number of rotating and wearing parts. High-grade precision gears and pinions with high-grade oversized ball bearings throughout are designed to insure accuracy, quiet operation, and long life. These units can be furnished with motor characteristics and style of mounting best suited to each application.

The company also has developed a splash-proof motor to prevent entrance of water even that splashed with terriffic pressure from any single angle, yet adequately ventilated and built in the same dimensions as standard open motors. A double baffle in an elliptical-shaped air passage in each endbell provides the protection. This construction, while permitting free passage of ventilating air, traps and drains water splashed into the air openings at the bottom of the elliptical-shaped chambers. Another original feature is a shaft guard which breaks the force of a stream directed along the shaft extension and prevents water from entering the bearing chamber.

Geared Power Is Built for Efficiency and Low Upkeep

The Continental Supply Co., St. Louis, Mo., has put on the market the Emsco-Falk geared power, designed to pump a group of wells with maximum efficiency and a minimum of maintenance expense. The power has a heavy, well-reinforced housing; powerful oversized gears and bearings, automatic lubrication, careful proportioning of parts and rigid anchorage to foundation. The gray iron housing has a heavy metal section and unusually heavy ribs.

The 160 MGP geared power is designed to meet the heavy load conditions encountered in deep-well pumping. It is equipped with a single crank. The crank disc has connections for 20 wells and a stroke of 36 inches. The single crank is offered owing to its mechanical simplicity and the fact that the load is imposed on the bearings with little overhang.

The overall ratio is 32 to 1, which works out favorably with gas or oil engine or electric motor drive through V-belts and is a conservative ratio for long-lived double reduction gearing.

The first gear reduction is spiral bevel, giving the required right-angle turn. The second is single helical.

For lubrication 70 gallons of oil are stored in the bottom of the case. A special positive self-priming reversing helical gear perfection oil pump with by-pass valve is mounted on the cover. It is driven through a set of speed-increasing gears from the intermediate shaft, providing a sufficient volume of lubricating oil when the wells are pumped at a speed of only six strokes per minute, yet producing no excessive pressure should the wells be pumped at 30 strokes.

Cost of Lifting Oil Lower With Admore Liner Barrel

The B-M-W Admore liner barrel, made by the Bradford Motor Works, Bradford, Pa., is said to be peculiarly adapted to the pumping of East Texas wells. The pump has been successfully used in territory deeper than in East Texas and is capable of producing a large quantity of fluid.

One advantage is that it is pulled complete with the rods, and repairs are made with a minimum of expense. At the present time many East Texas wells are being pumped with Admore liner barrels, and there is almost no pulling whatever. The pump is decidedly easier on sucker rods and the manufacturer asserts that a property equipped with Admores will show unusually low cost of lifting the oil to the surface.

The outside tubes are selected for size and finish. The plunger tube is made from high-grade seamless steel tubing. The plunger fitting body is of one-piece construction and made of alloy steel. A.P.I. balls and seats are used throughout.

Goble Devices Designed to Lighten Pumping Problems

The Goble No. 6 improved underpull jack, the Goble counterbalance, the Goble No. 6 overpull jack and the Goble Rain-proof oil-bath bearing, all made by the B. G. Goble Manufacturing Co., Tulsa, are oil field appliances of interest to the East Texas producers, and designed to lighten their pumping problems.

The Goble No. 6 improved underpull jack, weighing 3,600 pounds, has only one bearing and needs oiling once a year. It lifts the load with remarkable ease. It has a straight lift, and to pull the well it is necessary to pull two cotter pins only to disconnect the jack. The headache post feature may save expensive fishing jobs. The jack is adjustable sidewise and endwise. By removing two bolts the head slips back for pulling.

The Goble counterbalance can be fitted to old cranks and is interchangeable. To change to a crank of a different shape it is necessary only to run babbitt between the top and bottom castings and the crank. It is safer because it is not necessary to move on the blocking when detaching.

The Goble No. 6 overpull jack, weighing 3,100 pounds, has varied and controlled leverage on a seesaw rocker, which engineers say is among the most important of oil field inventions.

The Goble rain-proof oil-bath bearing, replacing D stirrups for multipliers, holdups, holddowns, etc., needs to be oiled only a few times a year. This bearing has a sediment basin into which cuttings settle away from the bearing surfaces.

Integrates for Pressure Along With Differential

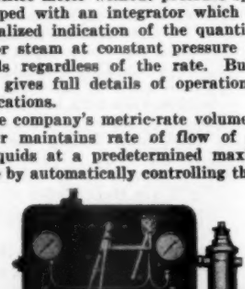
The integrating orifice meter for gas, oil, etc., made by the American Meter Co., Erie, Pa., gives a totalized indication of the quantity which has passed through the orifice for all rates of flow and all variations of pressure. It integrates for pressure as well as for differential.

In this integrator the effect of the pressure on the rate of the volume is continuously applied for any value or change in pressure from the perfect vacuum to maximum pressure. Therefore, multipliers or factors for change in pressure are not required. It is not necessary to regulate a pressure in order to assume

that it is constant. The integrator multiplies the square root of the differential by the square root of the aboslute pressure. The result is continuously totalized on a counter index.

The integrating flowmeter is the metric orifice meter without pressure spring, equipped with an integrator which gives a totalized indication of the quantity of gas or steam at constant pressure or of liquids regardless of the rate. Bulletin E-16 gives full details of operation and applications.

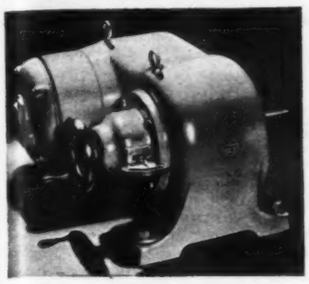
The company's metric-rate volume controller maintains rate of flow of gases or liquids at a predetermined maximum value by automatically controlling the differential produced by the rate of flow through an orifice. It is rugged, yet extremely sensitive. The differential gauge portion of the instrument responds quickly to any change in the rate of flow. The movement of the differential pen shaft is positive and promptly operates the valve of the control block which modifies the pressure on the diaphragm of the regulator, thereby accurately controlling the rate of flow by varying the opening in the regulator. The design eliminates "hunting" or great variation in the instantaneous rate of flow. There is no continuous leak.



The company's metric liquid level control can be used to control the liquid level in a tower or any hot or cold liquid. The valve for controlling the rate of flow is put in the pipe line feeding liquid to the tower, or in the liquid line from the tower. If a steam pump is used, the valve is placed in the steam line to the pump. This control will give a record of the elevation of the surface of the liquid in the tower or column.

Varidrive Speeds May Be Changed During Operation

The U. S. Varidrive motor, introduced by the U. S. Electrical Manufacturing Co., Los Angeles, Calif., permits increase or decrease of speed to any desired rate over a wide range while the driven machine is in operation. The unit consists of a simple squirrel-cage motor and a variable speed differential which comprises dual discs coupled with the U. S. varibelt. The differential discs, which are called varidiscs, reciprocally expand and contract for higher or lower speeds, transmitting power through the varibelt to the take-off shaft. Because of its few moving parts, varidrive is said to be reliable and durable.



The Varidrive motor is arranged for local or remote control. A hand wheel is mounted on the unit for local control. For remote control a push button station or a hand wheel may be installed at the most convenient location for the operator. Automatic remote control can also be furnished.

The operator may change the rotation 1, 10, 20 or 30 per cent, or any percentage of the range, quickly and easily. The microspeed adjustment of Varidrive is similar to the throttle control of an automotive engine. For just as a motor car speed may be increased or decreased 10, 20 or 30 miles an hour, so the speed of the Varidrive motor can be stepped up or down 10, 20 or 30 per cent or more, with the positive action of microspeed control.

McGregor Plunger Barrel Made for 2-Inch Tubing

The McGregor Working Barrel Co., Bradford, Pa., has brought out a new Mac plunger barrel for 2-inch tubing which is said to have been successful in handling floating sand and gypsum. It is so designed that parts can be interchanged without pulling the string of tubing.

A cast iron barrel is screwed to the bottom of a string of 2-inch tubing. At the bottom of this pump is attached a replaceable seat which is the same size as the 1¾-inch working barrel that fits inside the 2-inch cast iron barrel. This seat screws on the coupling and combination sand trap which are placed between the bottom of the barrel and the anchor.

Above this seat is a short length of 2-inch tubing which allows the plunger to work below the cast iron working barrel a distance of 18 to 24 inches. The cast iron barrel is attached to the tubing by a special coupling.

The plunger, which works in the cast iron barrel is said to have exceptionally long life because it oils and cleans itself with every stroke of the rods. It is made with such a close tolerance that cups are not required. The working valve is attached to the top of the plunger with a reversible valve body. It is not necessary to pull the tubing to replace the standing valve as provision has been made for drop valve seat, and the plunger assembly can be pulled out with the rods.

The standard McGregor working barrel or the McGregor plunger barrel can be inserted in this pump in place of the steel plunger, permitting the entire assembly to be pulled on the rods. This three-part combination can all be worked in the one cast iron barrel as necessary and this permits changes to be made to suit any pumping condition without pulling tubing.

Belt Tighteners Adapted for Power Installations

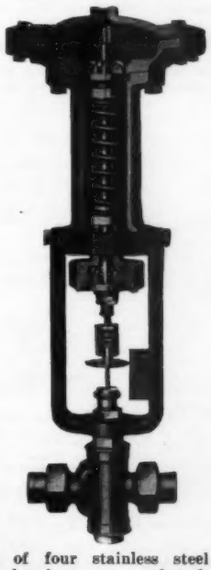
The new "Oilwell" No. 80 and No. 150 belt tighteners perfected by the Oil Well Supply Co., are especially suited for oil-bath geared power installations in the East Texas Field. Both sizes are Timken bearing equipped and are furnished with easily adjusted, flat-faced pulleys which ride on top of V-belt drives. These belt tighteners are sturdy, dependable, and have outstanding features which are described in leaflet No. 7.

A new line of safety drop-forged combination clamps for three-fourths inch, seven-eighths inch, 1-inch and 1⅛-inch A.P.I. pull rods has been developed by "Oilwell" for service with heavy-duty central powers. The pull-rod head and upset ends of the loop are completely hooded in each of these drop-forged clamps. These clamps are strong and safe. Leaflet No. 8 describes the 1-inch size.

Friction Loss in Brodie Meter Is Unusually Light

The C. J. Tagliabue Manufacturing Co., Brooklyn, N. Y., has started production on the TAG friction-free diaphragm valve. This improved superstructure is mounted on TAG V port balanced valves, giving gradual opening characteristics.

Friction is cut to a minimum by reducing the diameter of the spindle passing through the stuffing-box. The spindle is perfectly guided by its upper (large diameter) portion, which passes through two roller-bearing assemblies, each consisting of four stainless steel rollers. Roller bearings are preferred to ball bearings for guiding the reciprocating spindle movement in a frictionless manner.



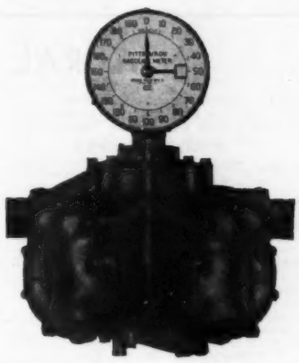
The spring (single or multiple) is enclosed, as is also the diaphragm. A positive indicator is furnished. Adjustments are easily made, available with 7½, 9½ and 11½-inch diameter diaphragm.

The company has put on the market also the TAG magnetic clutch flow controller. A complete line of orifice meters is available in this construction also. With a view of minimizing friction, binding and leakage the conventional pressure-tight bearing was discarded in favor of a magnetic clutch. The departure, the manufacturer says, brought with it two further advantages: (1) A regular construction suitable for 2,500 pounds working pressure and (2) ability to locate all internal parts so that they are immersed in the mercury and protected by it against moisture, dirt and corrosion. All internal parts including the float are stainless steel, thus realizing a corrosion-proof construction and making sealing chambers unnecessary.

New Size Meter Added to Pittsburgh Equitable Line

The Pittsburgh piston meter for use in bulk storage and tank truck measurements is now being made in the 3-inch size by the Pittsburgh Equitable Meter Co., Pittsburgh, Pa. The company's line of large capacity Pittsburgh piston meters now includes 1, 1½, 2, 2½ and 3-inch for measuring capacities from a maximum of 25 gallons per minute for the 1-inch meter to 300 gallons per minute for the 3-inch meter.

The 3-inch meter is in reality an enlargement of the design used in the other sizes. The meter, which measures through true positive piston displacement, is accurate regardless of rate of flow, changes in specific gravity, pressure fluctuation or variation in pressure head. All liquid entering the meter is measured, none by passed. The meter has four brass-lined single-acting pistons, the flow being controlled by a single rotary valve. The design is such that each piston comes to a positive stop at the end of its stroke, so the meter cannot stop on dead center and the pistons cannot become out of time with the valve.



Registers of the vertical set-back type, as illustrated, or of the straight reading horizontal set-back type are standard. For use in conjunction with these meters the company has developed the Pittsburgh strainer to protect the working parts from dirt or foreign matter.

Kerotest Chokes Simplify Throttling of Well's Flow

An efficient, economical method of throttling the flow on prorated wells and of controlling back pressures on sand producing wells is offered in the Kerotest steel adjustable control chokes perfected by the Kerotest Manufacturing Co., Pittsburgh, Pa. The chokes are made in all sizes from 2 to 6 inches to meet every field condition and every design of hookup. The 2, 2½ and 3-inch sizes are made from forged steel. The 4 and 6-inch sizes are from cast steel.

T type control chokes are used on flow arms of the christmas tree, serving as a combination T and choke, changing the direction of flow at right angles. Bolted bonnets make it easy to change orifice bushings or needles when in service without straining other connections.

Cross type control chokes are so designed that the needle valve can be withdrawn clear of the runway by opening the stem to the extreme open position. This gives a clear passageway through the choke equal to the size of pipe connection and enables the swab to be passed directly through it without disconnecting any part of the choke.

The full opening cross type has 3-inch pipe size outlets on all openings. The areaway through this choke is equal to the inside diameter of 2½-inch external upset tubing, and the needle control when in the wide open position will permit of flow through the choke equal to the capacity of the tubing. This type can also be regulated down to very minute areaway for the passage of the fluid. The needle control can also be withdrawn clear of the passageway to permit swabbing without removing from the hookup.

Tico Convertible Oil and Gas Engine Is Economical

Of interest to operators in the East Texas Field is the new Tico convertible oil and gas engine, made by the Titusville Iron Works Co., Titusville, Pa.

This Tico unit has been designed and perfected so that it can be changed from gas to oil field, or from oil to gas in two hours. It is rugged, serviceable and dependable. There is nothing complicated. A pumper can operate it easily and economically on either fuel oil or good grade western crude, according to the manufacturer.

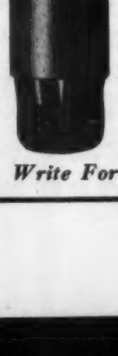
This engine is 100 per cent enclosed in design with removable plates for quick and easy accessibility to all working parts for adjustment or repair. An important reason for its power and smoothness, under all loads, is the specially designed poppet type inlet valve, simple in design but of ample size to admit the maximum gas and air mixture into the cylinder in a short space of time. The lightness and small lift of the valve permits it to operate efficiently without the use of a spring.

The cylinder head for the gas operated unit is made in two parts, an inner section which encloses the combustion chamber and a removable water jacket which makes cleaning easy without removing the head.

These units are available in 40 horsepower two-cycle, 50 horsepower roller bearing and 90-150 horsepower twin-cylinder types. In addition Titan roller bearing countershaft clutch can be furnished. This roller bearing pedestal type permits the use of straightway clutches for pumping, or reversible clutches when wells require cleaning or swabbing.

The initial expenditure for clutches is therefore greatly reduced and costly shut downs, repairs and replacements are eliminated. A bulletin, describing these engines and countershaft clutch is sent on request.

WALKER SUCKER ROD GUIDES



STABILIZE Rods and Pump.
REDUCE Rod Crystallization, Tubing Movement and Friction Load.
STOP Box Wear and Tubing Cutting.
USE WALKER GUIDES
They are entirely different in design and performance.

KORNER ENGINEERING CO.
Exclusive Manufacturers
2026 Santa Fe Ave., Los Angeles, Calif.
Write For Address Of Nearest Mid-Continent Distributor.

BUYERS' GUIDE

Listing various types of equipment required for lifting oil and the leading manufacturers and supply companies that handle such equipment, grouped under their classifications—

NATURAL OPEN FLOW — PUMPING — AIR - GAS LIFT

NATURAL OPEN FLOW

CASING

Bridgeport Machine Co., Wichita, Kans.
A. M. Byers Co., Pittsburgh, Pa. (Wrought iron only).
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
National Tube Co., Pittsburgh, Pa.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Republic Supply Co., Houston, Tex.
Reading Iron Co., Philadelphia, Pa. (Wrought iron only).
South Chester Tube Co., Chester, Pa.
Spang, Chalfant & Co., Pittsburgh, Pa.
Taubman Supply Corp., Tulsa, Okla.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

TUBING

Bridgeport Machine Co., Wichita, Kans.
A. M. Byers Co., Pittsburgh, Pa. (Wrought iron only).
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
National Tube Co., Pittsburgh, Pa.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, Ohio.
Republic Supply Co., Houston, Tex.
Reading Iron Co., Philadelphia, Pa. (Wrought iron only).
South Chester Tube Co., Chester, Pa.
Spang, Chalfant & Co., Pittsburgh, Pa.
Taubman Supply Corp., Tulsa, Okla.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

TOP HOLE CHOKES

Alco Oil Tool Co., Compton, Calif.
American Iron & Mach. Wks., Oklahoma City, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Shaffer Tool Wks., Brea, Calif.
Norvell-Wilder Supply Co., Beaumont, Tex.

BOTTOM HOLE CHOKES

Alco Oil Tool Co., Compton, Calif.
Petroleum Equipment Co., Fort Worth, Tex
Southern States Co., Shreveport, La.

BOTTOM HOLE CONTROL VALVE

Halliburton Oil Well Cementing Co., Duncan, Okla.

SURFACE EQUIPMENT

TUBING BLEEDERS

Byron Jackson Co., Los Angeles, Calif.

TUBING BLOCKS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Regan Forge & Engineering Co., San Pedro Calif.
Republic Supply Co., Houston, Tex.

TUBING CATCHERS

Bridgeport Machine Co., Wichita, Kans.
Byron Jackson Co., Los Angeles, Calif.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., Dallas, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Smith Separator Corp., Tulsa, Okla.

TUBING ELEVATORS

Bridgeport Machine Co., Wichita, Kans.
Chas. A. Butler Mfg. Co., Okmulgee, Okla.
Byron Jackson Co., Los Angeles, Calif.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., Dallas, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.

TUBING HANGERS

Hercules Tool Co., Tulsa, Okla.

TUBING ROTATORS

Hercules Tool Co., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.

TUBING TONGS

Baash-Ross Tool Co., Los Angeles, Calif.
Bridgeport Machine Co., Wichita, Kans.
Byron Jackson Co., Los Angeles, Calif.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.

TUBING SLIPS AND SPIDERS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
Baker Oil Tools, Inc., Huntington Park, Calif.
Bridgeport Machine Co., Wichita, Kans.
Cameron Iron Works, Inc., Houston, Tex.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., Dallas, Tex.
Hercules Tool Co., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Larkin Packer Co., St. Louis, Mo.
J. H. McEvoy & Co., Houston, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Improvements Co., Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Regan Forge & Engineering Co., San Pedro Calif.
Republic Supply Co., Houston, Tex.
Shaffer Tools Works, Brea, Calif.
W-K-M Co., Houston, Tex.

CASINGHEADS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
Brauer Machine & Supply Co., Oklahoma City, Okla.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Doheny Stone Drill Co., Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Tool Co., Tulsa, Okla.
International Supply Co., Tulsa, Okla.
Larkin Packer Co., St. Louis, Mo.
Lucey Products Corp., Tulsa, Okla.
Moser Mfg. Co., Kane, Pa.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
W. C. Norris Manufacturer, Tulsa, Okla.
Oil Well Improvements Co., Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Perkersburgh Mach. Co., Parkersburg, W. Va.
Republic Supply Co., Houston, Tex.
Shaffer Tool Works, Brea, Calif.

CASING ADAPTERS

Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Tool Co., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.

CASING CONNECTIONS

Bridgeport Machine Co., Wichita, Kans.
Doheny Stone Drill Co., Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Improvements Co., Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Regan Forge & Engineering Co., San Pedro, Calif.
Republic Supply Co., Houston, Tex.
Walworth Co., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

PERFORATED CASING (OIL WELL SCREENS)

Baash-Ross Tool Co., Los Angeles, Calif.
Brauer Machine & Supply Co., Oklahoma City, Okla.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
Kobe, Inc., Los Angeles, Calif.
Layne & Bowler, Houston, Tex.
J. H. McEvoy & Co., Houston, Tex.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Howard Smith Co., Houston, Tex.

CASING SHOES

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
Baker Oil Tools, Inc., Huntington Park, Calif.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Cameron Iron Works, Houston, Tex.
Continental Supply Co., St. Louis, Mo.
Doheny Stone Drill Co., Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Larkin Packer Co., St. Louis, Mo.
Lucey Products Corp., Tulsa, Okla.
J. H. McEvoy & Co., Houston, Tex.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburgh Mach. Co., Parkersburg, W. Va.
Republic Supply Co., Houston, Tex.
Shaffer Tool Works, Brea, Calif.
Texas Steel Co., Fort Worth, Tex.

VALVES AND FITTINGS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
Bridgeport Machine Co., Wichita, Kans.
Byron Jackson Co., Los Angeles, Calif.
A. M. Byers Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Continental Supply Co., St. Louis, Mo.
Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
E. M. Dart Mfg. Co., Providence, R. I.
S. R. Dresser Mfg. Co., Bradford, Pa.
Frick-Reid Supply Corp., Tulsa, Okla.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
Hanlon-Waters, Inc., Tulsa, Okla.
Hercules Tool Co., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
Hughes Tool Co., Houston, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lucey Products Corp., Tulsa, Okla.
Ludlow Valve Mfg. Co., Troy, N. Y.
Lunkenheimer Co., Cincinnati, Ohio.
Marion Machine Foundry & Supply Co., Marion, Ind.
MacClatchie Mfg. Co., Compton, Calif.
Moorlane Co., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Reading, Pratt & Cady Co., Inc., Bridgeport, Conn.
Stockham Pipe & Fittings Co., Birmingham, Ala.
Taubman Supply Corp., Tulsa, Okla.
Taylor Forge & Pipe Works, Chicago, Ill.
Titusville Iron Works Co., Titusville, Pa.
Tube-Turns, Inc., Louisville, Ky.
Henry Vogt Machine Co., Louisville, Ky.
Walworth Co., New York, N. Y.
Westcott Valve Co., East St. Louis, Ill.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

METERS

American Liquid Meter Co., Alhambra, Calif.
American Meter Co., New York, N. Y.
Ralph N. Brodie, Oakland, Calif.
Brown Instrument Co., Philadelphia, Pa.
Builders Iron Foundry, Providence, R. I.
Consolidated Ashcroft Hancock Corp., Inc., Bridgeport, Conn.
Foxboro Co., Foxboro, Mass.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
International Derrick & Equipment Co., Columbus, Ohio.
National Supply Co., Toledo, Ohio.
Neilan Co., Ltd., Boston, Mass.
Oil Conservation Eng. Co., Cleveland, Ohio.
Pittsburgh Equitable Meter Co.
Simplex Valve & Meter Co., Philadelphia, Pa.
Westcott & Greis, Inc., Tulsa, Okla.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa. (Electric).

OIL AND GAS SEPARATORS

American Tank & Equipment Corp., Oklahoma City, Okla.
Black, Sivalls & Bryson, Inc., Oklahoma City, Okla.
Foster Wheeler Corp., New York, N. Y.
Frick-Reid Supply Corp., Tulsa, Okla.
Hanlon-Waters, Inc., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
National Tank Co., Tulsa, Okla.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Smith Separator Corp., Tulsa, Okla.
Titusville Iron Works Co., Titusville, Pa.

STORAGE TANKS

Bethlehem Steel Co., Bethlehem, Pa.
Black, Sivalls & Bryson, Inc., Oklahoma City, Okla.
Butler Mfg. Co., Kansas City, Mo.
Chicago Bridge & Iron Works, Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Graver Tank & Mfg. Co., East Chicago, Ind.
Kirk Morrow Iron Works, Inc., Iola, Kans.
Maloney Tank Mfg. Co., Tulsa, Okla.
McClintic-Marshall Corp., Bethlehem, Pa.
National Supply Co., Toledo, Ohio.
National Tank Co., Tulsa, Okla.
North American Car Corp., Chicago, Ill.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Titusville Iron Works Co., Titusville, Pa.
Wyatt Metal & Boiler Works, Dallas, Tex.

FITTINGS FOR STORAGE TANKS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Black, Sivalls & Bryson, Inc., Oklahoma City, Okla.
Chicago Bridge & Iron Works, Chicago, Ill.
Crane Co., Chicago, Ill.
Frick-Reid Supply Corp., Tulsa, Okla.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
Graver Tank & Mfg. Co., East Chicago, Ind.
Hercules Supply Co., Fort Worth, Tex.
Jarecki Mfg. Co., Erie, Pa.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Lunkenheimer Co., Cincinnati, Ohio.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Moorlane Co., Inc., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Conservation Eng. Co., Cleveland, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

LIQUID LEVEL GAUGES FOR TANKS

American Meter Co., New York, N. Y.
Brown Instrument Co., Philadelphia, Pa.
Consolidated Ashcroft Hancock Corp., Bridgeport, Conn.
Crane Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Jerguson Gage & Valve Co., Somerville, Mass.
Lunkenheimer Co., Cincinnati, Ohio.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Conservation Eng. Co., Cleveland, Ohio.
Oil Well Supply Co., Dallas, Tex.
Penberthy Injector Co., Detroit, Mich.
Henry Vogt Machine Co., Louisville, Ky.
Westcott & Greis, Inc., Tulsa, Okla.

FLOATING DECKS

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Bridge & Iron Works, Chicago, Ill.
Kirk-Morrow Iron Works, Inc., Iola, Kans.

CLEANOUT EQUIPMENT

WINCHES

Alsteel Products Mfg. Co., Wichita, Kans.
Brewster Co., Inc., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Fred E. Cooper, Tulsa, Okla.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Mead-Morrison Mfg. Co., Boston, Mass.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Muskogee Iron Works, Muskogee, Okla.
Wilson Mfg. Co., Wichita Falls, Tex.
W-K-M Co., Inc., Houston, Tex.

PONY BULL WHEELS

J. B. Beaird Corp., Shreveport, La.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

PORTABLE OUTFITS

Allsteel Products Mfg. Co., Wichita, Kans
Continental Supply Co., St. Louis, Mo.
Fred E. Cooper, Tulsa, Okla.

Emsco Derrick & Equip. Co., Los Angeles
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co. Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Muskogee Iron Works, Muskogee, Okla.
National Supply Co., Toledo, Ohio.
Wilson Mfg. Co., Wichita Falls, Tex.

MASTS

Alten's Foundry & Mach. Wks., Lancaster, Pa.
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equip. Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pitts urgh, Pa.
Parkersburg Rig & Reel Co., Parkersburg W. Va.

SHEAVES

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co. Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Marion Machine Foundry & Supply Co., Marion, Ind.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg W. Va.
Regan Forge & Engineering Co., San Pedro, Calif.
John A. Roebling's Sons Co., Trenton, N. J.

CROWN BLOCKS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Baash-Ross Tool Co., Los Angeles, Calif.
J. B. Beaird Corp., Shreveport, La.
Brauer Machine & Supply Co., Oklahoma City, Okla.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Supply Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lucey Products Corp., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Marion Machine Foundry & Supply Co., Marion, Ind.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Republic Supply Co., Houston, Tex.
Regan Forge & Engineering Co., San Pedro, Calif.
Titusville Iron Works Co., Titusville, Pa.

WIRE LINE

American Cable Co., Wilkes-Barre, Pa.
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Hazard Wire Rope Co., Wilkes-Barre, Pa.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
A. Leschen & Sons Rope Co., St. Louis, Mo.
Mawhyte Co., Kenosha, Wis.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
John A. Roebling's Sons Co., Trenton, N. J.
Union Wire Rope Co., Tulsa, Okla.
Wickwire Spencer Steel Co., New York, N. Y.
Williamsport Wire Rope Co., Williamsport, Pa.

AGITATORS

Wm. Horn, Marietta, Ohio.

BAILERS

Baker Oil Tools, Inc., Huntington Park, Calif.
Bridgeport Machine Co., Wichita, Kans.
Frick-Reid Supply Corp., Tulsa, Okla.
Grant Oil Tool Co., Los Angeles, Calif.
Hart Bros. Machine Co., Clarksburg, W. Va.
International Derrick & Equipment Co. Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Larkin Packer Co., St. Louis, Mo.
J. H. McEvoy & Co., Houston, Tex.
Martin Decker Dev. Co., Long Beach, Calif.
Miller Sand Pump Co., Sapulpa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Shaffer Tool Works, Brea, Calif.
Spang & Co., Butler, Pa.
Star Drilling Machine Co., Akron, Ohio.

SCRAPERS FOR TUBING

Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
National Supply Co., Toledo, Ohio.

WALL SCRAPERS

Baker Oil Tools, Inc., Huntington Park, Calif.
Grant Oil Tool Co., Los Angeles, Calif.

SWABS

Alten's Foundry & Mach. Wks., Lancaster, Pa.
Brewster Co., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., Dallas, Tex.
Hart Bros. Machine Co., Clarksburg, W. Va.
C. M. Heeter Sons & Co., Butler, Pa.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Spang & Co., Butler, Pa.

SWABBING BOXES—SPLIT WIRE LINE

Petroleum Equipment Co., Fort Worth, Tex.

TRUCKS FOR CLEANOUT EQUIPMENT

Dodge Bros. Corp., Detroit, Mich.
International Harvester Co., Chicago, Ill.
General Motors Truck Corp., Pontiac, Mich.
Marmon-Herrington Co., Inc., Indianapolis.
National Supply Co., Toledo, Ohio.

PRIME MOVERS FOR CLEANOUT

ELECTRIC MOTORS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Louis Allis Co., Milwaukee, Wis.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., Cleveland, Ohio.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Wagner Electric Co., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

OIL ENGINES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Caterpillar Tractor Co., Peoria, Ill.
Continental Motors Corp., Detroit, Mich.
Continental Supply Co., St. Louis, Mo.
Cooper-Bessemer Corp., Mount Vernon, Ohio.
De La Vergne Engine Co., Auburn, N. Y.
Emsco Derrick & Equip. Co., Los Angeles.
Franklin Valveless Engine Co., Franklin, Pa.
Frick-Reid Supply Corp., Tulsa, Okla.
International Harvester Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
McIntosh & Seymour Corp., Bethlehem, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Power Mfg. Co., Marion, Ohio.
Jos. Reid Gas Engine Co., Oil City, Pa.
Republic Supply Co., Houston, Tex.
Waukesha Motor Co., Waukesha, Wis.
Weber Engine Co., Kansas City, Mo.
Worthington Pump & Mach. Corp., Harrison, N. J.

GAS ENGINES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bridgeport Machine Co., Wichita, Kans.
Caterpillar Tractor Co., Peoria, Ill.
Clark Bros. Co., Olean, N. Y.
Climax Engineering Co., Clinton, Iowa.
Continental Motors Corp., Detroit, Mich.
Continental Supply Co., St. Louis, Mo.
Cooper-Bessemer Corp., Mount Vernon, Ohio.
Emsco Derrick & Equip. Co., Los Angeles.
Franklin Valveless Engine Co., Franklin, Pa.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Motors Corp., Canton, Ohio.
Ingersoll-Rand Co., New York, N. Y.
International Derrick & Equipment Co., Columbus, Ohio.
International Harvester Co., Chicago, Ill.
International Supply Co., Tulsa, Okla.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Supply Co., Toledo, Ohio.
National Transit Pump & Machinery Co., Oil City, Pa.
Oil Well Supply Co., Dallas, Tex.
Pattin Bros. Co., Marietta, Ohio.
Jos. Reid Gas Engine Co., Oil City, Pa.
Republic Supply Co., Houston, Tex.
Titusville Iron Works Co., Titusville, Pa.
Waukesha Motor Co., Waukesha, Wis.
Worthington Pump & Mach. Corp., Harrison, N. J.
Young Engine Corp., Canton, Ohio.

GASOLINE ENGINES

Buda Engine Co., Harvey, Ill.
Bridgeport Machine Co., Wichita, Kans.
Caterpillar Tractor Co., Peoria, Ill.
Clark Bros. Co., Olean, N. Y.
Climax Engineering Co., Clinton, Iowa.
Continental Motors Corp., Detroit, Mich.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Motors Corp., Canton, Ohio.
International Derrick & Equipment Co., Columbus, Ohio.
International Harvester Co., Chicago, Ill.
International Supply Co., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
National Transit Pump & Machine Co., Oil City Pa.
Norvell-Wilder Supply Co., Beaumont, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.
Waukesha Motor Co., Waukesha, Wis.
Young Engine Corp., Canton, Ohio.

PUMPING

SURFACE PRIME MOVERS

STEAM ENGINES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Ajax Iron Works, Corry, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Doheny Stone Drill Co., Los Angeles, Calif.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Titusville Iron Works Co., Titusville, Pa.
Waukesha Motor Co., Waukesha, Wis.
Wilson-Snyder Mfg. Co., Braddock, Pa.

OIL ENGINES

(See similar classification under "Natural Open Flow")

GAS ENGINES

(See similar classification under "Natural Open Flow")

GASOLINE ENGINES

(See similar classification under "Natural Open Flow")

COMPRESSORS—PNEUMATIC

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chicago Pneumatic Tool Co., New York.
Clark Bros. Co., Olean, N. Y.
Continental Supply Co., St. Louis, Mo.
Cooper-Bessemer Corp., Mount Vernon, Ohio.
Gardner-Denver, Quincy, Ill.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., New York, N. Y.
National Supply Co., Toledo, Ohio.
National Transit Pump & Machine Co., Oil City, Pa.
Oil Well Supply Co., Dallas, Tex.
Schramm, Inc., Chester, Pa.
Sullivan Machinery Co., Chicago, Ill.
Titusville Iron Works Co., Titusville, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.
Young Engine Corp., Canton, Ohio.

PUMPS—HYDRAULIC

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Byron Jackson Co., Berkeley, Calif.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Gardner-Denver Co., Quincy, Ill.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
Goulds Pumps, Inc., Seneca Falls, N. Y.
International Derrick & Equipment Co., Columbus, Ohio.
Ingersoll-Rand Co., New York, N. Y.
National Supply Co., Toledo, Ohio.
National Transit Pump & Machine Co., Oil City, Pa.
Oil Well Supply Co., Oil City, Pa.
Prescott Co., Menominee, Mich.
Westco Pump Corp., Davenport, Iowa.
Wilson-Snyder Mfg. Corp., Braddock, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

ELECTRIC MOTORS

(See similar classification under "Natural Open Flow")

WELL EQUIPMENT

TUBING

Bridgeport Machine Co., Wichita, Kans.
A. M. Byers Co., Pittsburgh, Pa. (Wrought Iron only).
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
National Tube Co., Pittsburgh, Pa.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Pittsburgh Steel Co., Pittsburgh, Pa.
Reading Iron Co., Philadelphia, Pa. (Wrought Iron only).
Republic Steel Corp., Youngstown, Ohio.
Republic Supply Co., Houston, Tex.
South Chester Tube Co., Chester, Pa.
Spang, Chalfant & Co., Pittsburgh, Pa.
Taubman Supply Corp., Tulsa, Okla.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WORKING BARRELS

Axelson Mfg. Co., Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., So. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Fluid Packed Pump Co., Oklahoma City.
Frick-Reid Supply Corp., Tulsa, Okla.
C. M. Heeter Sons & Co., Inc., Butler, Pa.
C. N. Hough Mfg. Co., Franklin, Pa.
Jarecki Mfg. Co., Erie, Pa.
Larkin Packer Co., St. Louis, Mo.
McGregor Working Barrel Co., Bradford, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norris Bros., Robinson, Ill.
Norvell-Wilder Supply Co., Beaumont, Tex.
Northrup Equipment Co., Parkersburg, W. Va.
Oil Well Supply Co., Dallas, Tex.
Pacific Pump Works, Los Angeles, Calif.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.

SUCKER RODS

Axelson Mfg. Co., Los Angeles, Calif.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Machine Co., Wichita, Kans.
Buffalo Bolt Co., Buffalo, N. Y.
A. M. Byers Co., Pittsburgh, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
C. M. Heeter Sons & Co., Inc., Butler, Pa.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
S. M. Jones Mfg. Co., Toledo, Ohio.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Reading Iron Co., Philadelphia, Pa.
Republic Supply Co., Houston, Tex.
Texas Steel Co., Fort Worth, Tex.

PONY RODS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.

The Best Pump For East Texas

THE TEXAS STYLE NECO

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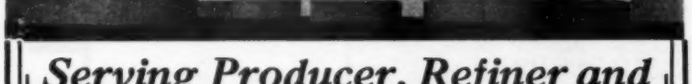

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Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
S. M. Jones Mfg. Co., Toledo, Ohio.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Reading Iron Co., Philadelphia, Pa.
Republic Supply Co., Houston, Tex.
Texas Steel Co., Fort Worth, Tex.

POLISH RODS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Bethlehem Steel Co., Bethlehem, Pa.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
S. M. Jones Mfg. Co., Toledo, Ohio.
Lucey Products Corp., Tulsa, Okla.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Northrup Equipment Co., Parkersburg, W. Va.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.
Shaffer Tool Works, Brea, Calif.
Texas Steel Co., Fort Worth, Tex.

ROD CLAMPS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Grant Oil Tool Co., Los Angeles, Calif.
Hercules Supply Co., Fort Worth, Tex.
Hercules Tool Co., Tulsa, Okla.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
McGregor Working Barrel Co., Bradford, Pa.
Moser Mfg. Co., Kane, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.
Shaffer Tool Works, Brea, Calif.
Texas Steel Co., Fort Worth, Tex.
Union Machine Co., Bartlesville, Okla.

SUCKER ROD PROTECTORS

Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
S. M. Jones Mfg. Co., Toledo, Ohio.
Kennedye Oil Field Devices Co., St. Louis.
Korner Engineering Co., Los Angeles, Calif.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.

SUCKER ROD HANGERS

Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
W-K-M Co., Inc., Houston, Tex.

POLISH ROD HANGERS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Grant Oil Tool Co., Los Angeles, Calif.
Hercules Supply Co., Fort Worth, Tex.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Mach. Co., Parkersburg, W. Va.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.

BALLS AND SEATS

Axelson Mfg. Co., Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Supply Co., Tulsa, Okla.
McGregor Working Barrel Co., Bradford, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norris Bros., Inc., Robinson, Ill.
Northrup Equipment Co., Parkersburg, W. Va.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.

VALVES FOR WORKING BARRELS

C. L. & W. W. Auer, Corry, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Halliburton Oil Well Cementing Co., Duncan, Okla.
C. M. Hecter Sons & Co., Inc., Butler, Pa.
C. N. Hough Mfg. Co., Franklin, Pa.
Jarecki Mfg. Co., Erie, Pa.
Larkin Packer Co., St. Louis, Mo.
McGregor Working Barrel Co., Bradford, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Northrup Equipment Co., Parkersburg, W. Va.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Petroleum Equipment Co., Fort Worth, Tex.
Titusville Iron Works Co., Titusville, Pa.

VALVE CUPS

C. L. & W. W. Auer, Corry, Pa.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Darling Valve & Mfg. Co., Williamsport, Pa.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
B. F. Goodrich Rubber Co., Akron, Ohio.
C. M. Hecter Sons & Co., Butler, Pa.
Jarecki Mfg. Co., Erie, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Supply Co., Toledo, Ohio.
Northrup Equipment Co., Parkersburg, W. Va.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
J. E. Scott Cup Co., Columbus, Ohio.

STUFFING BOXES

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Baash-Ross Tool Co., Los Angeles, Calif.
Bradford Motor Works, Bradford, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
Chas. N. Hough Mfg. Co., Franklin, Pa.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Lucey Products Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norris Bros., Inc., Robinson, Ill.
Northrup Equipment Co., Parkersburg, W. Va.
Norvell-Wilder Supply Co., Beaumont, Tex.
O. C. S. Mfg. Co., Coffeyville, Kans.
Oil Well Improvements Co., Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Mach. Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.

PUMPING DERRICKS

American Steel Derrick Co., Tulsa, Okla.
J. B. Beaird Corp., Shreveport, La.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Marion Machine Foundry & Supply Co., Marion, Ind.
McClintic-Marshall Corp., Bethlehem, Pa.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
O'Brien Steel Const. Co., Washington, Pa.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Steel Oil Derrick Co., Los Angeles, Calif.
Titusville Iron Works Co., Titusville, Pa.

STEEL FRONTS

WALKING BEAMS

American Steel Derrick Co., Tulsa, Okla.
J. B. Beaird Corp., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Marion Machine Foundry & Supply Co., Marion, Ind.
Moser Mfg. Co., Kane, Pa.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

SAMSON POSTS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
American Steel Derrick Co., Tulsa, Okla.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Marion Machine Foundry & Supply Co., Marion, Ind.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

JACK POSTS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
J. B. Beaird Corp., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.

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Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

BAND WHEELS

J. B. Beaird Corp., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Hercules Supply Co., Fort Worth, Tex.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Marion Machine Foundry & Supply Co., Marion, Ohio.
Titusville Iron Works Co., Titusville, Pa.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

CRANK AND SHAFT

Alten's Fdy. & Mach. Works, Lancaster, Pa.
J. B. Beaird Corp., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

BOXES

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

BEAM HANGERS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Brewster Co., Inc., Shreveport, La.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
Chas. N. Hough Mfg. Co., Franklin, Pa.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Mach. Co., Parkersburg, W. Va.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

PITMANS

Axelson Mfg. Co., Los Angeles, Calif.
Baker Oil Tools, Inc., Los Angeles, Calif.
Brewster Co., Inc., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

WRISTPINS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Brewster Co., Inc., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.
Republic Supply Co., Houston, Tex.

OFFSET CRANKS

Brewster Co., Inc., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.

PONY BULL WHEELS

J. B. Beaird Corp., Shreveport, La.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
International Derrick & Equipment Co., Columbus, Ohio.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

SAND REELS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Doheny Stone Drill Co., Los Angeles, Calif.
Emsco Derrick & Equip. Co., Los Angeles.
Hercules Supply Co., Fort Worth, Tex.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Kirk-Morrow Iron Wks. Co., Inc., Iola, Kans.
Lucey Products Corp., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Marion Machine Foundry & Supply Co., Marion, Ind.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

COUNTERBALANCES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Baker Oil Tools, Inc., Huntington Park, Calif.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc, Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.

SELF-CONTAINED UNITS

BELT DRIVEN UNITS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
International Derrick & Equipment Co., Columbus, Ohio.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

V-BELT DRIVEN UNITS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

GEARED UNITS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
International Derrick & Equipment Co., Columbus, Ohio.
Lufkin Foundry & Machine Co., Lufkin, Tex.
Lee C. Moore & Co., Inc., Pittsburgh, Pa.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Westinghouse Electric & Mfg., Co., East Pittsburgh, Pa.

SPROCKET AND CHAIN DRIVEN UNITS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
International Derrick & Equipment Co., Columbus, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.

CENTRAL POWERS

COMPLETE UNITS

Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
International Harvester Co., Chicago, Ill.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.

BAND WHEELS

Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.
Titusville Iron Works Co., Titusville, Pa.

IDLERS

Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.

BELT TIGHTENERS

Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.

GEARED

Lufkin Foundry & Mach. Co., Lufkin, Tex.
Jos. Reid Gas Engine Co., Oil City, Pa.
Titusville Iron Works Co., Titusville, Pa.

PULL RODS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Axelson Mfg. Co., Los Angeles, Calif.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.

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S. M. Jones Mfg. Co., Toledo, Ohio.
Lufkin Foundry & Machine Co., Lufkin, Tex
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Texas Steel Co., Fort Worth, Tex.

SWINGS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angeles.
Frick-Reid Supply Corp., Tulsa, Okla.
B. G. Goble Mfg. Co., Tulsa, Okla.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Texas Steel Co., Fort Worth, Tex.

PUMP JACKS

Alten's Fdy. & Mach. Works, Lancaster, Pa.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Emsco Derrick & Equip. Co., Los Angels.
Frank's Mfg. Co., Tulsa, Okla.
Frick-Reid Supply Corp., Tulsa, Okla.
B. G. Goble Mfg. Co., Tulsa, Okla.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Kirk-Morrow Iron Works, Inc., Iola, Kans.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
Marion Mach. Fdy. & Supply Co., Marion, Inc.
National Supply Co., Toledo, Ohio.
W. C. Norris Manufacturer, Tulsa, Okla.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Republic Supply Co., Houston, Tex.
Texas Steel Co., Fort Worth, Tex.
Union Machine Co., Bartlesville, Okla.

INSTALLATION ENGINEERS AND CONTRACTORS

Frick-Reid Supply Corp., Tulsa, Okla.
Dewey T. Ross, Inc., Tyler, Tex.

GAS COMPANIES

United Gas Co., Houston, Tex.

ELECTRIC POWER COMPANIES

Southwestern Gas & Elec. Co., Shreveport, Okla. Gas & Elec. Co., Oklahoma City, Okla.

AIR-GAS LIFT

PRIME MOVERS

STEAM ENGINES

(See similar classification under "Pumping")

OIL ENGINES

(See similar classification under "Natural Open Flow")

GAS ENGINES

(See similar classification under "Natural Open Flow")

GASOLINE ENGINES

(See similar classification under "Natural Open Flow")

ELECTRIC MOTORS

(See similar classification under "Natural Open Flow")

COMPRESSORS

Clark Bros. Co., Olean, N. Y.
Continental Supply Co., St. Louis, Mo.
Gardner-Denver Co., Quincy, Ill.
Ingersoll-Rand Co., New York, N. Y.
Leader Iron Works, Decatur, Ill.
National Supply Co., Toledo, Ohio.
Sullivan Machinery Co., Chicago, Ill.
Titusville Iron Works Co., Titusville, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

FITTINGS

(See similar classification under "Natural Open Flow")

FLOW HEADS

Hercules Tool Co., Tulsa, Okla.

TUBING ANCHORS

Hercules Tool Co., Tulsa, Okla.

BOILERS

Bridgeport Machine Co., Wichita, Kans.
Broderick Co., Munsey, Ind.
Continental Supply Co., St. Louis, Mo.
Donovan Boiler Works, Parkersburg, W. Va.
Frick-Reid Supply Corp., Tulsa, Okla.
International Supply Co., Tulsa, Okla.
Lucey Products Corp., Tulsa, Okla.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Titusville, Iron Works Co., Titusville, Pa.

SURFACE PIPE

American Rolling Mill Co., Middletown, Ohio.
Bridgeport Machine Co., Wichita, Kans.
A. M. Byers Co., Pittsburgh, Pa. (Wrought Iron only).
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Jos. Greenspon's Sons Pipe Co., St. Louis.
International Supply Co., Tulsa, Okla.
Jones & Laughlin Steel Corp., Pittsburgh.
National Supply Co., Toledo, Ohio.
National Tube Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Pittsburgh Steel Co., Pittsburgh, Pa.
Reading Iron Co., Philadelphia, Pa. (Wrought Iron only).
Republic Steel Corp., Youngstown, Ohio.
Republic Supply Co., Houston, Tex.
A. O. Smith Corp., Milwaukee, Wis.
South Chester Co., Chester, Pa.
Spang, Chalfant & Co., Inc., Pittsburgh, Pa.
Taubman Supply Corp., Tulsa, Okla.
Youngstown Sheet & Tubing Co., Youngstown, Ohio.

KICKOFF VALVES

National Supply Co., Toledo, Ohio.
Petroleum Equipment Co., Fort Worth, Tex.
Price-Trawick, Inc., Stroud, Okla.
Titusville Iron Works Co., Titusville, Pa.
Walworth Co., New York, N. Y.
Western Pneumatic Co., San Antonio, Tex.

SPECIAL LIFTING SYSTEMS

STAGE LIFTS

Petroleum Equipment Co., Fort Worth, Tex.
Western Pneumatic Co., San Antonio, Tex.
W-K-M Co., Inc., Houston, Tex.

CHAMBER LIFTS

Clark Bros. Co., Olean, N. Y.

PNEUMATIC CYLINDERS

Sullivan Machinery Co., Chicago, Ill.

PLUNGER LIFTS

Hughes Tool Co., Houston, Tex.

SUBMERGED DISPLACEMENT PUMPS

National Supply Co., Toledo, Ohio.
Petroleum Equipment Co., Fort Worth, Tex.

GAS LIFT, SYPHON SUBMERGED

Mission Mfg. Co., Houston, Tex.

SUBMERGED ELECTRIC PUMPS

Reda Pump Co., Bartlesville, Okla.

ELECTRIC POWER COMPANIES

Southwestern Gas & Elec. Co., Shreveport, La. (East Texas).
Oklahoma Gas & Elec. Co., Oklahoma City, Okla. (Oklahoma City).

GAS COMPANIES

United Gas Co., Houston, Tex.

ELECTRICAL EQUIPMENT

GENERATORS AND MOTORS

Louis Allis Co., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Wagner Electric Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TRANSFORMERS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
Kuhlman Electric Co., Bay City, Mich.
Moloney Electric Co., St. Louis, Mo.
National Supply Co., Toledo, Ohio.
Wagner Electric Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

SWITCHES AND PANELS

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Louis Allis Co., Milwaukee, Wis.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
National Supply Co., Toledo, Ohio.
Wagner Electric Co., St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

CONDUIT

General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE

American Steel & Wire Co., Chicago, Ill.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
National Supply Co., Toledo, Ohio.
John A. Roebling's Sons Co., Trenton, N. J.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

POLES

Ayer & Lord Tie Co., Chicago, Ill.
Continental Supply Co., St. Louis, Mo.

LIGHTING OUTFITS

Bridgeport Machine Co., Wichita, Kans.
Caterpillar Tractor Co., Peoria, Ill.
Continental Supply Co., St. Louis, Mo.
General Electric Co., Schenectady, N. Y.
Kohler Co., Kohler, Wis.
Moon Mfg. Co., Chicago, Ill.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

FLOODLIGHTS

Air Reduction Sales Co., New York, N. Y.
Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
General Electric Co., Schenectady, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Moon Mfg. Co., Chicago, Ill.
National Supply Co., Toledo, Ohio.
Republic Supply Co., Houston, Tex.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

MISCELLANEOUS PRODUCTION EQUIPMENT

ACID TREATING SERVICE

Dowell, Inc., Midland, Mich.

BEARINGS

American Roller Bearing Co., Pittsburgh, Pa.
Hyatt Roller Bearing Co., Newark, N. J.
Timken Roller Bearing Co., Canton, Ohio.

BELTING—FLAT

Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Fenwick-Redaway Mfg. Co., Newark, N. J.
Frick-Reid Supply Corp., Tulsa, Okla.
B. F. Goodrich Rubber Co., Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio
Imperial Belting Co., Chicago, Ill.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Rubber Co., Youngstown, Ohio.
Scandinavia Belting Co., New York, N. Y.
United States Rubber Co., New York, N. Y.
Thermoid Rubber Co., Trenton, N. J.
Victor Balata & Textile Belting Co., Easton, Pa.

BELTING—V-TYPE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Dayton Rubber Mfg. Co., Dayton, Ohio.
Frick-Reid Supply Corp., Tulsa, Okla.
Gaso Pump & Burner Mfg. Co., Tulsa, Okla.
Gates Rubber Co., Denver, Colo.
Goodyear Tire & Rubber Co., Akron, Ohio
International Derrick & Equipment Co., Columbus, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
National Supply Co., Toledo, Ohio.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery. Corp., Harrison, N. J.

BELT FASTENERS AND LACINGS

Clipper Belt Lacer Co., Grand Rapids, Mich.
Flexible Steel Lacing Co., Chicago, Ill.

CANS—WATERING

H. P. Gott Mfg. Co., Winfield, Kans.

CEMENT CONTRACTORS

Frick-Reid Supply Corp., Tulsa, Okla.
Dewey T. Ross., Inc., Tyler, Tex.

CHAINS—TRANSMISSION

Baldwin-Duckworth Chain Corp., Worcester, Mass.
Chain Belt Co., Milwaukee, Wis.
Continental Supply Co., St. Louis, Mo.
Diamond Chain & Mfg. Co., Indianapolis.
Frick-Reid Supply Corp., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
International Supply Co., Tulsa, Okla.
Link Belt Co., Chicago, Ill.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.

CHEMICAL LUBRICATORS

Petroleum Equipment Co., Fort Worth, Tex.

CLAMPS—LEAK

S. R. Dresser Mfg. Co., Bradford, Pa.

CONTROLLERS—GAS

Brown Instrument Co., Philadelphia, Pa.
Fisher Governor Co., Marshalltown, Iowa.
Foxboro Co., Foxboro, Mass.
McAlear Mfg. Co., Chicago, Ill.
Pittsburgh Equitable Meter Co., Pittsburgh.
C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.
Westcott & Greis, Tulsa, Okla.

COUPLINGS

S. R. Dresser Mfg. Co., Bradford, Pa.
National Supply Co., Toledo, Ohio.

DYNAMOMETERS (Pump and Pull Rod)

Martin-Decker Corp., Los Angeles, Calif.

ELECTRIC LANTERNS

Economy Electric Lantern Co., Chicago, Ill.

LIQUID LEVEL CONTROLLERS

Brown Instrument Co., Philadelphia, Pa.
Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.
Davis Regulator Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Iowa.
Foxboro Co., Foxboro, Mass.
Nellan Co., Ltd., Boston, Mass.
C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

MUD WEIGHTING MATERIAL

Baroid Sales Co., Los Angeles, Calif.

FLAME ARRESTORS

Chicago Bridge & Iron Works, Chicago, Ill.
Oil Conservation Eng. Co., Cleveland, Ohio.

GASKETS

Bridgeport Machine Co., Wichita, Kans.
Continental Supply Co., St. Louis, Mo.
Crane Co., Chicago, Ill.
Frick-Reid Supply Corp., Tulsa, Okla.
Garlock Packing Co., Palmyra, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., New York, N. Y.
McCord Radiator & Mfg. Co., Detroit, Mich.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Republic Supply Co., Houston, Tex.
Vellumoid Co., Boston, Mass.

ORIFICE FITTINGS

Byron Jackson Co., Los Angeles, Calif.
Crane Co., Chicago, Ill.
Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
Metric Metal Works, Erie, Pa.
National Supply Co., Toledo, Ohio.
Pittsburgh Equitable Meter Co., Pittsburgh, Pa.
Robinson Orifice Fitting Co., Los Angeles, Calif.

PACKERS

Baash-Ross Tool Co., Los Angeles, Calif.
Bridgeport Machine Co., Wichita, Kans.
Cameron Iron Works, Houston, Tex.
Continental Supply Co., St. Louis, Mo.
Frick-Reid Supply Corp., Tulsa, Okla.
Guiberson Corp., Dallas, Tex.
C. M. Heeter, Sons & Co., Inc., Butler, Pa.
International Supply Co., Tulsa, Okla.
Jarecki Mfg. Co., Erie, Pa.
The Lane-Wells, Los Angeles, Calif.
Larkin Packer Co., St. Louis, Mo.
National Supply Co., Toledo, Ohio.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Mach. Co., Parkersburg, W. Va.
Petroleum Equipment Co., Fort Worth, Tex.
Robinson Packer Co., Tulsa, Okla.
Shaffer Tool Works, Brea, Calif.
Spang & Co., Butler, Pa.

PACKING

C. L. & W. W. Auer, Corry, Pa.
Bridgeport Machine Co., Wichita, Kans.
Philip Carey Co., Cincinnati, Ohio.
Continental Supply Co., St. Louis, Mo.
Crane Co., Chicago, Ill.
Frick-Reid Supply Corp., Tulsa, Okla.
Garlock Packing Co., Palmyra, N. Y.
B. F. Goodrich Rubber Co., Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., New York, N. Y.
Lufkin Foundry & Mach. Co., Lufkin, Tex.
National Supply Co., Toledo, Ohio.
Norvell-Wilder Supply Co., Beaumont, Tex.
Oil Well Supply Co., Dallas, Tex.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Thermoid Rubber Co., Trenton, N. J.
Vellumoid Co., Boston, Mass.

PIPE THREADING AND CUTTING MACHINES

Axelson Mfg. Co., Los Angeles, Calif.
Bignall & Keeler Machine Works, Edwardsville, Ill.
Jarecki Mfg. Co., Erie, Pa.
Landis Machine Co., Waynesboro, Pa.
Nye Tool & Machine Works, Chicago, Ill.
Toledo Pipe Threading Machine Co., Toledo.

PORTABLE HOUSES

American Iron & Mach. Co., Oklahoma City, Okla.
Houston Ready-Cut House Co., Houston, Tex.
Frank's Mfg. Co., Tulsa, Okla.
International Derrick & Equipment Co., Columbus, Ohio.
National Supply Co., Toledo, Ohio.
Parkersburg Rig & Reel Co., Parkersburg, W. Va.
Southern Mill & Mfg. Co., Tulsa, Okla.

PUMP GOVERNORS

Fisher Governor Co., Marshalltown, Iowa.
Nellan Co., Boston, Mass.

REGULATORS—GAS

American Meter Co., New York, N. Y.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Davis Regulator Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Iowa.
Nellan Co., Inc., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.

STEEL, STRUCTURAL, PLATES, BARS, ETC.

Bethlehem Steel Co., Bethlehem, Pa.
International Derrick & Equipment Co., Columbus, Ohio.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.
Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa.
Jos. T. Ryerson & Sons., Inc., Chicago, Ill.
Tulsa Boiler & Machinery Co., Tulsa, Okla.
Wyatt Metal & Boiler Works, Dallas, Tex.

STOCKS AND DIES

Armstrong Bros. Tool Co., Chicago, Ill.
Nye Tool & Machine Works, Chicago, Ill.
Toledo Pipe Threading Machine Co., Toledo.

THREAD PROTECTORS

Pittsburgh Screw & Bolt Corp., Pittsburgh.
Wedge Protectors, Inc., Cleveland, Ohio.

TREATMENT OF EMULSIONS

Dehydrators—Electric

Petroleum Rectifying Co. of Calif., Los Angeles, Calif.

Chemicals

Separafine Mfg. Co., Bristow, Okla.
Tretolite Co., St. Louis, Mo.

TRACTORS

Caterpillar Tractor Co., Peoria, Ill.
International Harvester Co., Chicago, Ill.

TRAPS—STEAM

Fisher Governor Co., Marshalltown, Iowa.

WIRE LINE

See similar list under "Natural Open Flow."

WELDING AND CUTTING APPARATUS

Air Reduction Sales Co., New York, N. Y.
American Steel & Wire Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Victor Welding & Equip. Co., San Francisco.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Lincoln Electric Co., Cleveland, Ohio.
John A. Roebling's Sons Co., Trenton, N. J.
Linde Air Products Co., New York, N. Y.
Jos. T. Ryerson & Sons, Inc., Chicago, Ill.
Universal Power Corp., Cleveland, Ohio.

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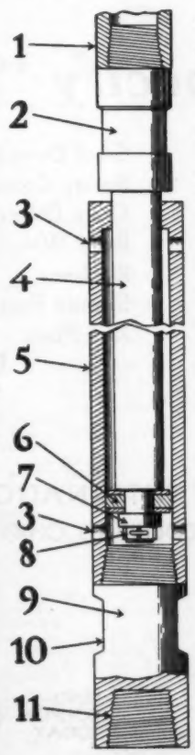


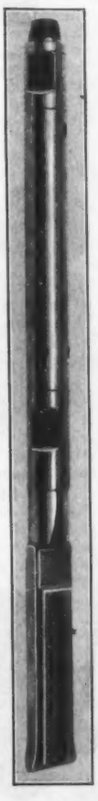
This tool consists of a plunger in a steel barrel with openings near the bottom and top.

It is attached between the stem and bit; a slow drilling or pumping motion imparts an up and down movement of the plunger in the barrel; on the up-stroke the fluid is forced out of the holes in the upper part of the barrel, on the down stroke the fluid is forced with high pressure out of the lower holes in the barrel; these holes are drilled on different angles, thus forcing the fluid out of the barrel in different directions as the tools turn, reaching all parts of the wall of the well, mixing the sand, paraffine and cavings with the fluid in the well so that it may be taken out with a Bailer or Sand Pump.

Old stripper wells can be cleaned out with this AGITATOR at a cost that will pay, while the old methods would be prohibitive.

This tool will also agitate wells enough to make them flow where the rock pressure is still good.

Descriptive Circular Upon Request.



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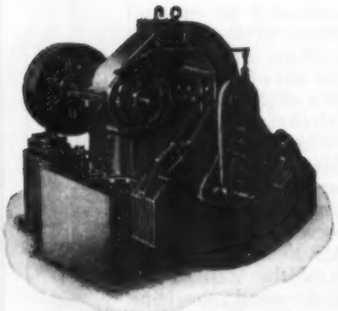

Geared Pumping Unit for Multi-Well Service.

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Band Wheels	Tubing Blocks
Rig Irons	Crown Blocks
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Return to Old Crude Prices Finds Oklahoma Oil Production Far Below Purchasers' Demands

By W. A. SPINNEY
Staff Correspondent, Oklahoma Fields

Producers in the Oklahoma City Field are continuing to hold their crude oil notwithstanding the recent advance in crude oil prices. Crude oil production from Oklahoma shows a decline for the week ending June 17 of approximately 50,000 bbls. a day.

Withdrawals from storage have been heavy in Oklahoma and Kansas during the last few weeks because the Oklahoma Corporation Commission refused to permit higher allowables from the flush areas in the State until higher prices were offered.

Production from the principal pools in the State for the week ending June 17 was as follows:

Pool—	Week ending June 15	Previous week
Bowlegs	9,635	8,365
Bristow-Slick	10,000	10,000
Burbank	10,000	9,750
Carr City	8,475	6,945
Earlsboro	13,230	10,675
East Earlsboro	14,020	14,395
South Earlsboro	1,465	1,155
Little River	14,315	12,830
East Little River	1,165	1,100
Oklahoma City	120,629	180,715
Seminole City	9,615	9,010
Tatums	3,950	4,000
Total	216,490	269,200
Others	190,460	185,900
Total State	406,950	455,100

Barnsdall Oil Co.'s No. 1 Waltermire, NW cor. SW NW, Section 33-21-1w, south of Perry in Noble County, was coring the Oswego lime at 4,445 feet after finding a showing of oil. This well is near the Waltermire gas field in Noble County, but it will be drilled to the Wilcox sand in search of oil.

In the Wentz Pool, in Noble County, Shell Petroleum Corp.'s No. 1 Mary Farr, C NE SE, Section 19-20-2w, which found water at a total depth of 5,387 feet, Wilcox sand, may be given a treatment with acid.

Important Southern Wildcats

Production was extended a mile northwest in the Cement Field by Willard L. Miller's No. 1 Garner, SE cor. SW, Section 26-6-10w, Caddo County. The well tested an oil showing at 3,382-97 feet and flowed at the rate of 100 bbls. of oil and 10,000,000 feet of gas a day. This test was drilled on a lease that was farmed out by the Carter Oil Co.

The well was drilled to a total depth of 3,792 feet, where the tools were lost and after fishing a few days it was decided to plug back. While the well was drilling it found a number of showings of oil and gas.

Another important wildcat test in southern Oklahoma is the Navajo Oil & Gas Co., Ramsey Petroleum Co. and others' No. 1 Martin, SE cor. SW NW, Section 18-1-5w, on the Cruce structure in Stephens County. This test found a showing of oil at 4,910 feet and was coring. It is expected to be drilled to the Wilcox sand which is expected to be found around 6,500 feet.

Good Wells in Tatums

In the Tatums Field in Carter County two producers were completed with an initial flow of around 1,100 bbls. a day. Locations were staked offsetting both wells. Lundy & Winkler's No. 1 Majors, SE cor. NW SE, Section 25-1s-3w, swabbed 405 bbls. of oil in 14 hours and the operators estimated the well at 700 bbls. a day. The casing was cemented at 2,345 feet. The oil was found in a sand series at 2,509-2,644 feet. The same operators made a location for No. 2 Majors, 660 feet to the north.

Frank Gouin and K. D. Oil Co.'s No. 3 J. Burton, NW cor. SW, Section 30-1s-2w, swabbed 287 bbls. of oil in 22 hours. The operators estimated it would make 400 bbls. a day when cleaned out and put on the pump. The oil was found in sand series at 2,361-2,464 feet. The same operators made location for No. 4 J. Burton, 660 feet to the north.

7,000-Foot Test

J. Harmon Lewis and others' No. 1 M. E. Clark, C NW NW, Section 34-21-6w, south of Enid, in Garfield County, is a location with the material moving in. This test is about 14 miles west of the Garber-Covington area, and is located on a structure that has been seismographed for a distance of about 5 miles northwest and southeast and about 2 miles east and west, lying in Townships 20-6w and 21-6w. The test is expected to be drilled to the Wilcox sand, or approximately 7,000 feet.

In addition to the lease holdings of Lewis and others' major oil companies own leases in the vicinity, including Indian Territory Illuminating Oil Co., Empire Oil & Refining Co., Stanolind Oil & Gas Co., Gypsy Oil Co., Mid-Continent Petroleum Corp. and Twin State Oil Co.

Test Promised in Major County

In Major County another wildcat test may be drilled in the northern part of the county. The Indian Territory Illuminating Oil Co., Continental Oil Co. and Ramsey Petroleum Co. have a large block and the proposed location is Section 32-22-14w. Titles are being examined and it is expected the actual work on this operation will start some time in July. This area has been core drilled and the acreage was originally blocked by the Marland Oil Co. and upon its merger the acreage went to the Continental Oil Co. South of the location there is a block of Federal land on which the Phillips Petroleum Co. and Cities Service Co. have drilling permits. Leases are being taken in Grant County, around the townsite of Lamont. Part of the block will cover the townsite.

Busy in Pontotoc County

Southeastern Pontotoc County is expected to be active during the summer months. Major oil companies are blocking acreage in this area and some are adding to their present leases. The acreage play has been in Townships 2n-7, 1n-7, and 1n-8. This area is east and south of the Fitts gas pool, which was discovered by W. A. Delaney in Section 30-2-7, about three months ago, where two gas wells have been completed.

Choctaw Oil & Gas Co.'s No. 1 Thompson, SW cor. NE SW Section 1-1-7, was fishing at 1,070 feet after finding two showings of gas in shallow horizons.

Cochran and E. H. Moore's No. 1 Wirick, SE cor. SW Section 29-2-7, found a showing of oil in sand at 1,514-29 feet, and the casing was being underreamed.

W. E. McCraw's No. 1 Mayhue, NE cor. Section 19-2-6, has landed 8-inch casing at 725 feet and was preparing to drill deeper.

Sledge and others' No. 1 Wooley, SW cor. SE SW Section 22-2-7, was preparing to spud.

Indications point to a resumption of drilling operations at the wildcat test of Burns and Prince's No. 1 Dock, SW cor. Section 21-8-18w, Washita County, in the western part of the State. Showings of gas were found in a shallow formation before the well was shut down at 2,160 feet, about six months ago.

C. E. Prince and J. M. Rice are assembling acreage around the test agreeing to drill the test to a total depth of 4,000 feet. Leases recently taken include parts of Sections 7, 16, 17, 18, 19, 20, 22, 26, 27, 28, 30, 32, and 33, all in Township 8-18w.

Testing New Law

The first test of the new proration law was started during the week in the District Court of Oklahoma City, before Judge R. P. Hill, when Edwin Dabney, proration attorney, filed suit against the Refiners Production Co., charging it with overproducing its No. 1 Katy, in the north end of the field, with a potential of 2,894 bbls. a day.

It was charged that the company had

Wildcat Operations in Oklahoma

Northern Oklahoma

ALFALFA COUNTY

Company, farm and location— Remarks:
Acre et al's No. 1 Acre, C SW NE Sec. 14-24-11w..... O.W.D.D.; drlg. 5,532 ft.

BECKHAM COUNTY

Pattee Royalty Co.'s No. 1 Goose Tree, SW SE SW SE Sec. 32-10-23w ..... Drlg. 2,900 ft.

CADDO COUNTY

Denver P. & R. Co.'s No. 1 Noe, NW SW SW Sec. 34-10-10w ..... Drlg. 9,070 ft.
W. L. Miller's No. 1 Gardner, SE SW Sec. 26-6-10w.... Rig.

COAL COUNTY

Dodd & Burton's No. 1 Grigsby, NW SE NE Sec. 35-1-8.. Oil show 1,858-67 ft; C.O.
Funk & Russell's No. 1 Miller, SE NE Sec. 10-2-8 ..... Drlg. 2,940 ft.

GARFIELD COUNTY

Continental Oil Co.'s No. 1 Thompson, NW SW SW Sec. 7-24-4w ..... Drlg. 6,310 ft.

HUGHES COUNTY

Dixie-Lee Oil Co.'s No. 1 Taylor, C NW Sec. 27-5-10.... Drlg. 350 ft.
Gilcrease Oil Co.'s No. 1 Thompson, NW SE Sec. 34-7-8. Drlg. 710 ft.
Pioneer Pet. Co.'s No. 1 Brock, SE cor. Sec. 26-5-11 .....Rig.
Redwine et al's No. 1 Badger, C N half SW SW Sec. 4-5-11 ..... Drlg. 330 ft.

KAY COUNTY

Blauner et al's No. 1 Maple, NE NW SE Sec. 20-27-4.... Drlg. 660 ft.

KIOWA COUNTY

Christian's No. 1 Jones, NE NW Sec. 8-7-18w ..... Drlg. 1,720 ft.
McWhirter et al's No. 1 Vanderneck, NE NW Sec. 3-7-19w (O.W.D.D.) ..... Drlg. 2,155 ft.

LINCOLN COUNTY

Magnolia Pet. Co.'s No. 1 Wagoner, SW SE Sec. 2-14-3 ..Drlg. 2,220 ft.

LOGAN COUNTY

Gypsy Oil Co.'s No. 1 McConnell, C NE SE Sec. 28-17-4w. Drlg. 5,355 ft.
Shell Pet. Corp.'s No. 1 Faulkner, C SE NW Sec. 11-15-4w. Drlg. 6,395 ft.

MURRAY COUNTY

A. E. Harden's No. 1 Sadler, NE Sec. 19-1-2..... Rig.

MUSKOGEE COUNTY

J. S. Routt et al's No. 1 Escoe, CWL SE NE Sec. 17-13-17. Machine.

NOBLE COUNTY

Shell Pet. Corp. 's No. 1 Farr, C NE NE, Sec. 19-20-2w.. Wilcox sand 5,000-27 ft; second sand 5,065-5,144 ft.; flow 1,110 bbls. 4 hrs., 40 min.; comp.
Sinclair Prairie's No. 1 Jerome, SW cor. Sec. 15-20-2w. Drlg. Wilcox sand 5,256 ft.

OKLAHOMA COUNTY

Mid-Continental Oil Co.'s No. 1 Edwards, C SE SE Sec. 19-11-1 ..... Drlg. 360 ft.
F. Russell's No. 1 Heapley, SW NW NE Sec. 23-12-3w..Rig.

OKFUSKEE COUNTY

Natl. Investors' No. 1 Billy, SE NW NW Sec. 29-13-9... Drlg. 4,050 ft.

PAYNE COUNTY

Kemp & Nunnelee's No. 1 Crane, SW SE SW Sec. 19-17-6 Drlg. 1,090 ft.
O. N. Maines et al's No. 1 Scheldberg, NW SW NW Sec. 27-22-5 ..... Sand 3,125-28 ft.; wtr.

PITTSBURG COUNTY

Moffett & Hall's No. 1 Jones, C NE NW Sec. 14-5-14 ..Drlg. 2,550 ft.

PONTOTOC COUNTY

Brydia et al's No. 1 Thomas, SW NE Sec. 20-2-7.....Rig.
Gilbert's No. 1 Starritt, NW SE Sec. 28-4-6..... Drlg. 360 ft.
Choctaw O. & G. Co.'s No. 1 Thompson, SW NE SW Sec. 1-1-7 ..... Drlg. 1,070 ft.
W. E. McGraw's No. 1 Mayhue, NE Sec. 19-2-6.....Drlg. 950 ft.
Williams' No. 1 Kroth, NE SE Sec. 32-3-6..... Fishing 1,717 ft.
Wirrick's No. 1 Lee, SE SW Sec. 29-2-7 ..... Drlg. 1,560 ft.

POTTAWATOMIE COUNTY

Payne Drlg. Co.'s No. 1 Lovelace, NW SW NW Sec. 27-6-4 W.O.C.S. 3,623 ft.

SEMINOLE COUNTY

Filmlee's No. 1 Bowlegs, SE NE SW Sec. 1-7-7 ..... Drlg. 440 ft.
Armstrong et al's No. 1 Diamond, NE SE SW Sec. 3-6-7.. Spudding.
Donnelly et al's No. 1 Shepard, SE NE Sec. 4-8-8..... Sand 1,395-1,405 ft; wtr.; fishing 1,540 ft.

Southern Oklahoma

ATOKA COUNTY

Blake's No. 1 Galbreath, SW NE SE Sec. 5-1-15 ..... Drlg. 1,110 ft.
L. E. Stewart et al's No. 1 Stewart, SE SE Sec. 2-4s-10 .. Drlg. 1,685 ft.
Wacker et al's No. 1 Baskett, SW NE NW Sec. 13-1-15.. Drlg. 325 ft.

CARTER COUNTY

P. Turner's No. 1 Dove, NE NW SE Sec. 3-5-1..... Rig.
E. M. Boring's No. 1 Morgan, C NE NW SW Sec. 4-1s-3w 3,000,000 ft. gas 2,038-39 ft. comp.

JEFFERSON COUNTY

Abbott et al's No. 1 Simmons, NW cor. Sec. 14-2s-6..... Drlg. 815 ft.
Hobbs' No. 1 Barnett, NE SE SW Sec. 32-5-5w..... Drlg. 2,190 ft.
Wakefield's No. 1 Kelly, NW SE Sec. 1-5-5w..... Drlg. 650 ft.

MARSHALL COUNTY

Thomas' No. 1 Setliff, SW SE SE SW Sec. 36-5-6..... Abd. 1,110 ft.

STEPHENS COUNTY

Doyle Oil Co.'s No. 1 Cunningham, SE NE NW Sec. 4-1-5w ..... Drlg. 2,500 ft.
Navajo O. & G. Co.'s No. 1 Martin, SE SW NW Sec. 18-1-5w ..... Drlg. 4,770 ft.
Sledge et al's No. 1 Worley, SW SE SW Sec. 22-2-7w.... Spudding.

TILLMAN COUNTY

Emenheiser et al's No. 1 Pace, C SW Sec. 3-4s-17w..... Drlg. 2,986 ft.
Gypsy Oil Co.'s No. 1 Pitcher, NW Sec. 26-4s-15w..... Drlg. 2,764 ft.
Gypsy Oil Co.'s No. 1 Co. Do. Pony, NW cor. Sec. 27-4s-15w ..... Drlg. 650 ft.

overproduced approximately 9,000 bbls. up to June 12, and that the well was still producing. About a week ago the corporation commission granted the company a permit to clean out the well, and from the suit it appears that the company is using this permit as its defense.

The case was set for trial last Thursday, but on the request of the proration attorney it was dismissed by District Judge R. P. Hill. Mr. Dabney intimated that the case would be refiled before the corporation commission when a quorum is available. This would have been the first test of the new proration law.

Champlin Wants More Oil

Champlin Refining Co. filed with the Corporation Commission a petition for a supersedeas from its May 26 order, which fixes allowables for the Oklahoma City Field on the same basis as the May allowable. In so doing the commission refused to accept the increased nominations made by the Champlin Refining Co. and other purchasers of crude oil.

The Champlin Refining Co. now asks that it be permitted to take 15,000 bbls. a day from its wells in the Oklahoma City Field to meet its refinery demands, and it offers to produce the oil under a bond, which may be fixed by the commission.

Prior to the May 26 order, the Champlin Refining Co. petitioned for 15,000 bbls. a day on higher allowables, but the case was continued. At the present time this petition and several other similar petitions by other purchasers has been set for hearing June 27.

In the Oklahoma City Field there are 96 producing wells receiving water exemptions as of June 12, the state umpire's office reports. These wells are making more than 10 per cent water. Wells making less than 10 per cent water are not given this extra allowable of 100 bbls. daily. Thirty-five of these wells are flowing naturally, while 61 wells are on the air-gas lift. Total production of the wells is 18,315 bbls. daily. The average amount of cutting by the water is 55.2 per cent.

Effective July 1, the staff of the conservation department will be reduced to five field men, and the State will be redistricted. The office personnel also will be reduced by one clerk.

A general reduction in salaries also becomes effective July 1. The general reduction was forced by the state budget committee.

To Prevent Waste

A gas-oil ratio is needed in the Oklahoma City Field to prevent waste, according to the testimony at a series of hearings held last week before the Corporation Commission, when it was brought out that some wells have a large gas volume, with small oil flow.

It was recommended that the high ratio wells either be classed as gas wells or that all wells be tubed in order to bring the ratio to a low figure. Failing to do this, it was alleged, production of the high ratio wells will continue to drain the field of its energy and at the same time cause a huge physical waste of the product into the air. Some engineers recommend a ratio of 4,000 feet of gas to 1 barrel of oil, although it was admitted it will be impossible to bring some of the ratios that low.

Proposed Gas-Oil Ratio

An exhibit was presented to the commission by Don Knowlton, of the Phillips Petroleum Co., and is shown in the following table:

Ratio in feet—	No. wells	Ave. ratio	Oil prod.	Gas prod.
Over 30,000	53	61,000	2,296	139,501,000
10,000 to 30,000	44	13,000	4,532	62,298,000
5,000 to 10,000	69	6,700	13,555	90,877,000
3,000 to 5,000	39	3,700	9,778	36,155,000
2,000 to 3,000	44	2,400	12,425	29,287,000
1,500 to 2,000	35	1,700	12,291	20,937,000
1,000 to 1,500	43	1,260	13,196	16,625,000
500 to 1,000	59	740	27,167	20,034,000
Under 500	19	460	6,942	3,150,000
Total	404	91,760	102,192	418,873,000

Protecting Oklahoma City

The Oklahoma City council voted new regulations on oil wells within the city limits and also established measures to prevent gas wastage and danger to the city and property. The new ordinance was drawn by a group of engineers and applies particularly to artificial means of production.

The penalty for violation of the ordinance is fixed at $19 and costs, with each day to constitute a separate offense. Section 1 provides for filing of notice with the fire department and city oil inspector. Section 2 requires a blowout preventer which shall be a permanent fixture; all valves and connections to test 3,000 pounds pressure. When tubing is being run the well shall be killed. Section 3 provides for pressure not to exceed 1,000 pounds in pipe lines and setting of boosters within 75 or 100 feet of the derrick. Section 4 provides for use of tested casing and laying of lines under streets, alleys and public thoroughfares. Section 5 provides for pressure gauges on air or gas lift equipment. Section 6 gives authority to the oil and gas inspector to shut down or curtail work. Section 7 is the penalty provision.

The city council granted drilling permits to the Denver Producing & Refining Co. for two wells in the E half NW, Section 3-11-3w, in the zone opened for drilling by the council. The exact locations have not been staked but it is expected they will be located on Blocks B and D of the amended cotton oil mill subdivision.

A mile northeast of the State Capitol, Frank Russell, Inc.'s No. 1, NW cor. SW SW SE, Section 23-12-3w, is a rig completed. This well is expected to be drilled to the Wilcox sand to test the north trend from the present wells in the Oklahoma City Field.

The Blackwell Oil & Gas Co.'s No. 1 School Land, SW cor. SW SE, Section 36-12-3w, was drilling around 3,000 feet.

Crude Oil Shipments

Crude oil shipments from the Oklahoma City Field for the first 10 days of June averaged 150,400 bbls. a day, indicating that the producers are kept almost even with the allowables which are approximately 159,000 bbls. It is believed that a considerable amount of this crude oil is going to storage.

Oil shipments by companies were as follows for the first 10 days in June:

Company—	Bbls.
Anderson-Prichard	5,375
Canadian P. L.	15,099
Capitol P. & R.	8,497
Central P. L.	4,269
Champlin Ref.	22,352
Continental	55,216
Eason Oil	11,642
Empire	249,565
Wirt Franklin	27,467
Globe Oil	97,745
Healdton P. L.	32,265
Phillips	577,497
I. T. I. O.	167,210
Magnolia	1,406
Major Pet.	8,867
Oklahoma P. L.	19,445
Ocate P. L.	9,943
Pet. P. L.	36,071
Shell P. L.	37,924
Stanolind	52,295
Sunray	1,332
Wilcox	62,511
Total	1,504,002

Atoka County

Kelly-Spring's No. 3 Southern Lumber Co., NW cor. SW Section 3-1s-14, was drilling at 240 feet. Croxton's No. 3 Miller, SW cor. NE NE Section 9-1s-14, made 3 bbls. from 226-65 feet.

Carter County

K. D. Oil Co.'s No. 4 Burton, SW cor. NW Section 30-1s-2w, is a rig. Kanaco Oil Co.'s No. 3 Coffey, NW cor. NE SE NW Section 25-4s-3w, was dry and abandoned at 2,403 feet. Athey & Lively's No. 1 Pierce, NE cor. SE Section 18-2s-2w, made 10 bbls. from 2,275-80 feet, total depth 2,432 feet.

Comanche County

Ashcraft & Palmer's No. 2 School land, NE cor. SE SE Section 20-2-10w, made 5 bbls. from 5,850-69 feet.

Cotton County

Donald Brothers' No. 1 Wilson, NW cor. SW NW NW Section 6-2s-9w, was abandoned at 2,203 feet. P. Olds and others' No. 1 Wilson, NW cor. Section 6-2s-9w, was drilling at 1,600 feet.

Creek County

P. Boyle and others' No. 1 Jackson, CSL NE NE Section 3-18-10, is a rig. F. L. Marrs' No. 2 Tiger, SE cor. NE NE Section 34-18-8, is a location. Ray Dean's No. 1 Grayson, SE cor. NW Section 3-18-8, is a rig. Big Four Petroleum Co.'s No. 2 McIntosh, SE cor. SW SE Section 34-19-8, was drilling at 1,000 feet. Johnson Oil & Refining Co.'s No. 1 Grisel, NW cor. SE Section 20-19-9, was drilling at 1,000 feet. S. W. Anthony's No. 2 Warlecy, SW cor. SE Section 4-16-12, an old well drilling deeper, total depth 1,978 feet. Billingslea and others' No. 1 Arbuckle, SW cor. NW Section 33-14-8, was abandoned at 3,487 feet. Shaffer and others' No. 1 Brown, NE cor. SE SE NE Section 7-18-11, was abandoned at 1,915 feet. Johnson Oil & Refining Co.'s No. 3 Johnson, SW cor. NE Section 29-19-9, made 55 bbls. from 2,081-2,138 feet. Dean and others' No. 1 Foster, NE cor. SE NE Section 19-19-9, made 6 bbls. from 2,415-41 feet. Taylor and others' No. 1 Green, CNL S half SE Section 28-19-8, was abandoned at 700 feet.

Hughes County

Shawnee Oil & Gas Co.'s No. 1 Willingham, SW cor. NW Section 24-7-8, is a rig. Mid-Continent Petroleum Corp.'s No. 3 Factor, SE cor. NW SE Section 15-7-8, is a rig. Same company's No. 2 Factor, SW cor. NE SE Section 15-7-8, made 110 bbls. from 1,174-1,200 feet. O. Tilly's No. 2 Walker, CEL NE NW Section 22-7-8, made 65 bbls. from 1,163-79 feet. Manahan's No. 3 Tiger, SE cor. NW SW Section 10-7-8, made 130 bbls. from 2,929-33 feet.

Marshall County

Thomas and others' No. 1 Setloff, SW cor. SE SE SW Section 36-5s-6, was abandoned at 1,110 feet. J. Peacock's No. 3 Flinn, CEL SW SW Section 3-7s-6, made 500,000 feet of gas from 800-04 feet, total depth 862 feet.

Oklahoma County

Indian Territory Illuminating Oil Co.'s No. 5 Little, SE cor. NE NE Section 27-11-3w, is a location. Same company's No. 6 Little, NE cor. SE NE Section 27-11-3w, is a location. Same company's No. 2 South Glendale, SW cor. NW NW Section 26-11-3w, is a location. Same company's No. 3 Wickline, NW cor. SW NW Section 26-11-3w, is a location. F. Russell, Inc.'s No. 1 Highley, SW NW SE Section 23-11-3w, is a rig. Phillips Petroleum Co.'s No. 3 Berg, C NW NE SW Section 26-11-3w, made 3,007 bbls. in four hours from 6,538-6,628 feet.

Okmulgee County

Rutz Oil Co.'s No. 1 Davis, NE cor. SE NW Section 1-12-13, was abandoned at 2,731 feet. Papoose Oil Co.'s No. 7 Osborne, CEL NE SW Section 21-15-14, made 5 bbls. from 2,177 feet, total depth 2,577 feet.

Okfuskee County

Atlantic Oil Producing Co.'s No. 2 Fixico, SW cor. SE SE Section 2-11-10, is a location. Olean Petroleum Co.'s No. 1 Fish, NE cor. NW Section 36-10-11, made 50 bbls. from 3,188-3,200 feet.

Osage County

Lewis Production Co.'s No. 3, NW cor. NE Section 28-24-7, is a rig. Same company's No. 1, SE cor. SW Section 21-24-7, made 220 bbls. from 2,661-81 feet. Peters and others' No. 1, SE cor. NE Section 16-24-7, made 280 bbls. from 2,586-2,640 feet. E. O. Platter's No. 9, NW cor. SW NE Section 30-22-9, was abandoned at 503 feet.

Pottawatomie County

Oklahoma Oil Corp.'s No. 1 Swan, SE cor. SW SE Section 36-7-4, made 180 bbls. from 4,245-49 feet. Phillips Petroleum Co.'s No. 1 Negah, NE cor. SW Section 28-7-4, made 148 bbls. from 4,209-40 feet.

Seminole County

Gypsy Oil Co.'s No. 2 Coker, SE cor. SW NE Section 2-8-5, is a rig. Keyokla Oil Co.'s No. 1, NE cor. NW SW Section 36-6-7, is a rig.

Stephens County

Trahan & Martin's No. 1 Dolan, CWL NW Section 15-1s-8w, is a location.

Tillman County

Gypsy Oil Co.'s No. 1 Co-Do-Pony, NW cor. Section 27-4s-15w, was drilling at 600 feet.

Tulsa County

Baker and others' No. 1 Barns, NE cor. SE SW Section 17-19-11, was abandoned at 2,295 feet. Holmes & Burton's No. 1 Howard, CWL NE Section 19-19-9, made 30 bbls. from 1,796-1,810 feet.

IMPORTANT BOOKS
for the Oil Man's Library

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This book will be found valuable by executives, purchasing agents, plant managers, superintendents, research directors, chemists, technologists, sales-managers, salesmen, and students. It is the most useful book of its kind with which we are familiar, the data being complete and conveniently arranged.

"Chemical Guidebook" may be purchased through the Book Department of The Oil and Gas Journal at the regular postpaid price of $2, payable by check or money order before book is mailed.

INTRODUCING "MAGIC EYE"

CHATHAM, Ontario, June 17.—Imperial Oil, Ltd., has commenced the introduction of the "magic eye" device for checking the cleanliness of crankcase oil. The device is being installed in the various stations of the company throughout Canada.

THOMAS DROPE DIES

CHATHAM, Ontario, June 17.—Thomas Drope, of Copleston, Ontario, died recently in his sixty-fourth year. For many years he was a prominent driller and oil producer, drilling chiefly at Copleston and Selkirk.

Extend Wilcox Sand Pay in Hollow Pool, Harvey County, and Drill Gusher in Reno County

By W. A. SPINNEY
Staff Correspondent, Kansas Fields

The Derby Oil Co. extended the Wilcox sand zone in the Hollow Pool in Harvey County, Kansas, about 2 miles to the north from the discovery well in the past week. Another large well was being completed in eastern Reno County. A large producer was found in the Winfield Townsite Pool, in Cowley County.

The Derby Oil Co.'s Wilcox sand well is due north of the two other Wilcox sand wells in the Hollow Pool, and is the first in the north extension area of the Hollow Pool. It is No. 2 Schmidt, in NE cor. NW NW, Section 17-22-3w. Wilcox sand was found at 3,570-72 feet where it first swabbed 40 bbls. an hour for seven hours. It was then drilled deeper to 3,573 feet and swabbed 105 bbls. in one and one-half hours, lowering the fluid level but little. It later swabbed an average of 60 bbls. an hour for 14 hours. The oil is 43 gravity and no water was showing. The well will probably be drilled deeper.

The next well to be drilled to the Wilcox sand is Skelly Oil Co.'s No. 2 Schmidt, NW cor., Section 17-22-3w, which found only a showing of oil in the Hunton lime at a total depth of 3,429 feet. It was given a treatment of acid but did not improve.

The Texas Co.'s No. 1 well, in Section 8-22-3w, in the north edge of the Hollow Pool, flowed 300 bbls. of oil in 15 hours from chat at a total depth of 3,206 feet.

The discovery Wilcox sand well in the Hollow Field has been put on the pump. It was Producers & Refiners Corp.'s No. 2 Martens, in Section 19-22-3w. The well pumped 195 bbls. of oil in six hours from a total depth of 3,515 feet.

Mid-Kansas Oil & Gas Co.'s No. 2 Duerkson, in Section 19-22-3w, flowed 180 bbls. of oil in one and one-half hours from the chat at a total depth of 3,233 feet.

Looks Like Gusher

Flowing by heads Manning & Terry, Inc. and others' No. 1 Goering, NW cor. NE, Section 1-23-4w, in eastern Reno County, looks like a gusher from the chat formation. No gauge was taken of the oil and gas production, some estimating the well from 2,000 to 2,500 bbls. a day. The oil and gas were found in the chat at 3,253-3,353 feet. This well is about 6 miles southwest of production in the Hollow Pool.

Good Well in Winfield

One of the largest wells completed on the Winfield townsite in Cowley County was the Sinclair Prairie Oil Co.'s No. 3 J. W. Dibbens, on Lot 9, Block 4, of Section 22-32-4. It swabbed 1,205 bbls. of oil in 24 hours from the Siliceous lime at a total depth of 3,288 feet.

Production by Pools

The daily average production of the principal pools in the State for the week ending June 17, was as follows:

Pool—	Week ending June 17	Previous week
Hollow	6,505	6,310
Ritz-Canton	16,050	16,075
Voshell	5,765	5,680
Sedgwick County	9,495	10,180
Mabee (Nikkel)	8,310	8,960
Ellsworth County	984	1,095
Barton County	660	670
Rice County	2,960	3,075
Reno County	1,225	1,210
Stafford County	195	190
Total	52,149	55,445
Others	52,951	51,000
Total State	105,100	106,445

Sinclair Prairie Oil Co.'s No. 1 Neufeldt, in Section 18-22-3w, in the Hollow Pool, Harvey County, found the Misener sand at 3,407 feet, and the Hunton lime at 3,409 feet, where the 8-inch casing was being landed and cemented. The same company's No. 2 Neufeldt, in Section 18-22-3w, has landed the 8-inch casing at 3,150 feet, with the total depth of the well 3,317 feet.

Over the county line in Reno County and west of production in the Hollow Pool, in Reno County, Frank Hollow and others' No. 1 Heiderbricht, in Section 36-22-4w, landed and cemented 8-inch casing at 3,261 feet. Before the casing was landed a core was taken from 3,261-64 feet that showed oil saturation.

Olson Oil Co. and others' No. 2 Adkins, in Section 35-23-4w, Reno County, found the chat at 3,375 feet and is shut down waiting for cement after landing the 5-inch casing at 3,335 feet.

In McPherson County

In the Decker gas area of the Ritz-Canton-Decker Field in McPherson County, W. D. Dunn and others' No. 1 Severton, SE cor. NE SE Section 9-19-2w, on the extreme west edge of the field, was showing oil in the top of the chat at 2,944 feet. The hole was drilled to 2,967 feet. It filled up 2,500 feet with fluid.

H. Rosenthal and Aladdin Petroleum Corp.'s No. 1 Knudson, SW cor. W half SE Section 23-19-2w, found oil in the Viola lime at 3,380 feet. The oil rose 1,100 feet in the hole.

Dickey Oil Co. and others' No. 1 Williams, NE cor. E half NW Section 26-19-2w, swabbed 45 bbls. of oil in nine hours from the Viola lime at 3,370-73 feet. It will be given a treatment with acid. It is a diagonal offset to the No. 1 Knudson well.

H. Dietrich and others' No. 1 Whittall, in Section 29-19-1w, in the Ritz-Canton Field, McPherson County, flowed 18 bbls. of oil in three hours from the chat at a total depth of 2,975 feet.

The wildcat test, Clum and Washoma Petroleum Corp.'s No. 1 Nelson, NW cor. SE NW Section 12-18-4w, McPherson County, about 10 miles north of the townsite of McPherson, found its second showing of gas at 1,965 feet. The first showing was found at 1,065-75 feet. It was drilling deeper at 2,150 feet. The next formation expected is the Kansas City-Lansing lime.

In the Voshell Pool, Inman and others' No. 4 Zerger, in Section 16-21-3w, in McPherson County, pumped 969 bbls. of oil and 55 bbls. of water in 48 hours from the Viola lime at 3,449 feet. This gives the well a potential of 484 bbls. a day.

In the Johnson Pool, in McPherson County, the McPherson Oil & Gas Co. and Hartman's No. 1 West, in Section 34-19-3w, was drilling at 2,480 feet.

Underproduced Oil

According to the umpire's report, Kansas operators held back during the month of May approximately 15,000 bbls. a day of allowable oil in the prorated fields. The total amount of underproduced or underrun oil was 465,130 bbls. during this period. The total allowable of these prorated areas for the same month was 1,901,298 bbls. and the pipe line shipments totaled 1,436,168 bbls. This was from a total of 438 prorated wells.

No estimate was made of the amount of oil that has been put into storage during this same time by operators that are refusing to sell oil at the present market prices.

In the central western Siliceous lime fields six pools are shut in awaiting a pipe line outlet. The potential production of these areas is as follows:

Pool—	Pot. in bbls. per day	May ship-ments
Davidson (4-16-11w)	75	shut in
Isern (12-20-11w)	1,073	2,815
Scheufler (9-20-11w)	700	14,843
Breford (7-17-10w)	500	9,593
Heiken (25-17-10w)	300	5,443
Stoltenberg (22-16-10w)	8,026	shut in
Stratman (23-16-10w)	20	shut in
Stratman (1-17-10w)	9,214	16,190
Beyer (31-19-9w)	200	2,698
Chase (32-19-9w)	600	17,363
Orth (27-18-10w)	400	5,416
Ploog (33-18-9w)	800	23,461
Schurr (21-20-10w)	11,988	41,626
Sharpe (30-20-10w)	2,090	9,085
Steckel (31-19-10w)	150	shut in
Greenwalt (17-19-16w)	50	shut in
Gates (27-21-13w)	150	shut in
Richardson (36-22-12w)	4,900	4,826
Total	41,236	154,349
Average per day	41,236	5,979

In the Ritz-Canton area in McPherson County the 117 deep sand wells had a potential of 38,455 bbls. on June 1, a monthly allowable of 678,843 bbls. and the pipe line shipments were 487,194 bbls. The 66 chat producers had a combined potential of 4,373 bbls. a day and a monthly allowable of 91,551 bbls. and the pipe line shipments took all the oil. The total 183 wells in the field producing from both zones had a combined potential of 42,828 bbls. and a monthly allowable of 770,394 bbls. and the pipe line shipments totaled 578,745 bbls., leaving an underproduction of 191,649 bbls.

The Hollow Pool, with 37 wells, had a total allowable of 312,655 bbls. for the month of May, and the pipe line shipments totaled 219,321 bbls., leaving an underproduction of 93,334 bbls.

The 17 wells in the Johnson area of McPherson County were permitted to produce 250 bbls. per well each day for a total of 4,250 bbls. The total monthly allowable was 147,009 bbls. and the pipe line shipments were 62,394 bbls., leaving an underproduction of 84,615 bbls. All but one well in the pool shows an underage.

The Mabee Pool in McPherson County has 19 wells with a potential of 23,726 bbls. a day, with a monthly allowable of 290,143 bbls. and the pipe line shipments from the field show a total of 245,497 bbls., leaving an underage of 44,646 bbls.

In the Voshell Pool in McPherson County there are 101 deep sand wells with a potential of 15,690 bbls. a day with a monthly allowable of 171,844 bbls. and the pipe line shipments totaled 154,844 bbls., leaving an underage of 17,276 bbls. The 17 chat producers in the same field had a total potential of 1,014 bbls. on June 1, with a total allowable of 21,294 bbls., all of which was taken by the pipe line companies. The total 118 wells had a combined potential of 16,704 bbls. and total allowable of 193,138 bbls. and the total pipe line shipments were 175,862 bbls.

Cowley County

Wakefield's No. 3 Daniels, NW cor. NE SW Section 7-30-5, was dry and abandoned at 2,860 feet. Sinclair Prairie Oil Co.'s No. 2 Dribben, NW cor. SE NE Section 22-32-4, made 1,205 bbls. from 3,280-90 feet.

Ellsworth County

Gypsy Oil Co.'s No. 1 Orth, SW cor. Section 15-16-10w, is a rig.

Rice County

Maxcourt Oil Co.'s No. 7 Adams, NW cor. SE NW SW Section 32-19-9w, is a rig.

Harvey County

Mid-Kansas Oil & Gas Co.'s No. 5 Duerkson, SW cor. NE Section 19-22-3w, is a rig. Stanolind Oil & Gas Co.'s

(Continued on Page 128)

Wildcat Operations in Kansas

(Descriptions are East unless marked otherwise)

BARTON COUNTY

Company, farm and location— Remarks:

Noble Drlg. Co.'s No. 1 Grant, SW SW Sec. 4-20-11w.... T.D. 3,362 ft; P.B. to 3,325-35 ft. pumped 12 bbls. dly.; comp.

Rankin et al's No. 1 Socog, C SW NE Sec. 34-18-12w .Drlg. 3,504 ft.

BUTLER COUNTY

Marylyn Oil Co.'s No. 1 Harsh, NE SW Sec. 33-23-5 ....Machine.

COWLEY COUNTY

E. Yarnell's No. 1 Speer, SE NE NE Sec. 31-33-6 ..... Drlg. 1,200 ft.

ELK COUNTY

Austin et al's No. 1 Wade, C NE NE Sec. 9-29-12 .. ...Drlg. 1,855 ft.

ELLSWORTH COUNTY

Rex Etnyre's No. 1 Arnsman, C SW SW Sec. 10-15-7w..Rig.

GRAHAM COUNTY

Schleimeyer et al's No. 1 Smith, SE Sec. 14-8-25w... Fishing 4,130 ft.

GREENWOOD COUNTY

Chas. Roser et al's No. 1 Hull, NW SE Sec. 8-26-9 .... Drlg. 1,950 ft.

Reeser & Chriswell's No. 1 Wright, C SW SW Sec. 23-25-15 .....Spudding.

Wright's No. 1 Madren, SW SE SW Sec. 29-23-12 Machine.

KINGMAN COUNTY

Garden et al's No. 1 Unknown. Sec. 11-27-7w ..... Drlg. 1,690 ft.

McPHERSON COUNTY

Clum et al's No. 1 Nelson, C NE NW Sec. 12-18-4w.....Drlg. 2,000 ft.

Sever and Hessman's No. 1 Scrag, S½ SE Sec. 23-19-4w..Rig on ground.

Gaume & Maxwell's No. 1 Goering, NE SE SW Sec. 24-23-3w .....Rig.

Investers Mineral Dev. Co.'s No. 1 Kaufman, SE Sec. 35-21-3w .....Rig.

Roth & Farout's No. 1 Swanson, NE SW NE Sec. 13-19-3w .....Rig.

PRATT COUNTY

Ninnescah O. & G. Co.'s No. 1 Hardesty, SW SE SE Sec. 28-27-11w .....Drlg. 4,427 ft.

RENO COUNTY

Roth & Farout's No. 1 Yoder, C NW NW Sec. 15-24-5w..C.O. 825 ft.

RICE COUNTY

Langston et al's No. 1 Wells, NE SE Sec. 4-20-9w.....Drlg. 2,475 ft.

ROOKS COUNTY

Kruger's No. 1 Rathburn, SE NW SW Sec. 14-9-16w.....Rig.

SALINE COUNTY

Dieter, Warren and Lario O. & G. Co.'s No. 1 Fulton, SW NW Sec. 14-16-2w .....Drlg. 2,900 ft.

SUMNER COUNTY

Deal O. & G. Co.'s No. 1 Tompkins, SW cor. Sec. 26-32-1. Fishing 3,490 ft.

WOODSON COUNTY

Ward McGinnis' No. 1 Ross, NW SE Sec. 32-25-14 .....Drlg. 1,520 ft.

WOODSON COUNTY

F. Field's No. 1 Munson, SW NE SW Sec. 9-25-14 .....Drlg. 500 ft.

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New Pool Confirmed by Bastrop County Well; Good Oil Showing in Northeast Peters Pool

By B. D. STEVENSON
Staff Correspondent, Southwest Texas Fields

SAN ANTONIO, Tex., June 19.—Marts & Beavens opened a new pool in Bastrop County north of the Yost Pool and Al Buchanan's No. 1 Foster, a much watched wildcat in northern Duval County, made a water well. Shasta's No. 4 Peters that tested a good oil showing on drill stem test a mile northeast of the discovery gas well of the Peters Pool in Duval County tested water at 2,350 feet where it had showed oil and is coring deeper.

These were features of the past week and along with them O. W. Killam's No. 1 Sights in northwestern Atascosa County got a poor cement job and tested water too but coming from around the casing.

Marts & Beavens opened the new pool in Bastrop with No. 2 Reyes, 12 feet in the Serpentine at 1,707 feet and it is going on the pump, estimated at around 100 to 150 bbls. daily, the oil about 32 gravity from guesses made in the field. It is being tested for gravity and quality.

The well is in the Addison Lytton League a few miles north of the Yost Serpentine Field and is near the town of Cedar Creek. Initially it bailed 5 bbls. an hour running the bailer every half hour. Then it increased and was bailing 7 bbls. an hour when bailing ceased to rig up to pump. Serpentine in the producing fields is much thicker than 12 feet but it was feared to go deeper in the first well since it is a good producer where it is. No. 1 Reyes, 640 feet southwest of No. 2, had a lot of oil in a considerable section of the Serpentine but was drilled too deep and got into water.

Location of the new Serpentine Pool in Bastrop County is credited to the work of the magnetometer which has been used quite extensively in Bastrop County with success. In some instances the magnetometer was able to locate the Serpentine plug but tests drilled found it barren of oil. In the new field and also over the better producing part of the Riddle Field the magnetometer was used and on a location made as result of it Marts & Beavens brought in No. 2 Riddle for 72 bbls. an hour.

Hilbig Pool

Humble Oil & Refining Co. last week completed No. 4 Wilhelm for 20 bbls. an hour in the Hilbig Pool, a much smaller well than most that the Humble has been getting in that Serpentine field. Total depth is 2,570 feet, topping the Serpentine at 2,427 feet and with casing set at 2,429 feet. The company this week is starting No. 3 Annie Hasler, 295 feet from the west line of the lease and 1,205 feet from the south line of the Samuel Wolfenbarger Survey, a little northwest of the discovery well.

Edwards Lime Tests

Of the three deep Edwards lime tests along the Balcones Paton Brothers' No. 1-B Turner on the Tanglewood fault in Lee County at 6,540 feet late last week was still in the Georgetown and slightly past where the Edwards was expected. Humble Oil & Refining Co.'s No. 1 Hardy in central Wilson County recently spudded in was at 1,233 feet and in rock and Zavala Oil & Gas Co.'s No. 1 Gates in Zavala County at 5,845 feet and in chalk. Top of the chalk has not positively been determined but it was pretty well in.

It is about 100 miles from the Humble well in Wilson, west and a little south to the Zavala County test and about 125 miles from the Humble test northeast to the Lee County test, which covers nearly the whole length of the Balcones Fault zone and the three tests are attracting especial attention because removed farther towards the Gulf than the usual zone of Edwards lime drilling and in a territory necessitating pretty deep drilling to reach the Edwards lime. Amerada Petroleum Corp.'s No. 1 Halff & Oppenheimer, about 20 miles east and a little north of No. 1 Gates in Zavala County, got the top of the Edwards at 6,302 feet. At 6,312 feet it was abandoned.

Develop Moca Pool

D. R. Semmes, geologist, who made the location for the discovery well in the Moca Field, is completing his No. 1 Duval County Ranch Co. in that field, a little northeast of the discovery well and southwest of the S.R.C. producer. It is on a direct line between them. At total depth of 891 feet it stood 700 feet in oil and is going on the pump. Construction work is under way on the pipe line from that field and this is stimulating activity to some extent. Semmes has made location for his No. 2, a little northeast of his No. 1.

Bexar County

C. W. Boler's No. 1 Kearney in Bexar County, a little south of San Antonio, was being tested over the week end for a showing in the Austin chalk with casing set at 1,100 feet and total depth 1,170 feet. It was intended for an Edwards lime test and will drill to the Edwards if it fails to make a producer in the chalk, and should get the Edwards in a week's drilling.

O. W. Killam's No. 1 Seitz was a disappointment to everyone. It had a pretty good showing of oil in Serpentine at 3,629 feet and set casing to make a test. Magnetometer work has been done over that territory and it indicated a Serpentine plug and Duval Oil Corp. took a considerable block north of the Killam test. Killam bailed No. 1 Seitz to the bottom and later as it was swabbing it showed some gas and then mud came in and filled the hole and changed to water as bailing continued. Circulation test showed that the cement failed to hold and it will be recemented. The well is close to Anchorage in northwestern Atascosa.

Duval-McMullen

Al Buchanan abandoned at 2,358 feet his No. 1 Foster in Survey 270 about 4 miles north of the North Government Wells Pool. It topped the Cole sand at 1,461 feet, the Government Wells sand at 2,123 feet and the Mirando sand at 2,352 feet. The first two sands showed a little oil but they all carried water though the test ran 45 feet higher as compared with Buchanan & Terrell's No. 1 Hagist about a mile north and a little east in Survey No. 267 which had about 10,000,000 feet of gas in the Government Wells sand at 2,134-44 feet.

With the evidences of another pool somewhere in that part of the country operators are not going to quit yet. Earl Frates blocked acreage through that part of the county and was instrumental in getting some of the tests drilled and the rig from Buchanan's No. 1 Foster is being moved north about 4 miles to Boysen & Hotchkin's No. 1 Hagist in Survey No. 8 in southern McMullen County, which is playing the same district.

Other operations in the Duval-McMullen territory this week included the testing of Shasta Oil Co. and Highland Oil Co.'s No. 4 Peters about 1 mile northeast of their discovery gas well in the Peters Pool. It was tested at 2,350 feet and made water, though on drill stem test it showed a lot of oil. They are coring ahead. Brooklyn Oil Co.'s No. 1 Sutherland, another mile to the northeast, set casing Friday and was expected to be ready to test about Monday.

Smith & Capps' (now Shasta Oil Co. and Highland Oil Co.) No. 1 Peters discovery well made a 20,000,000-foot gas well at 2,431-51 feet in the Government Wells sand. It is evident that No. 4 Peters is in a shallower sand.

Following the Government Wells trend up through McMullen County, S.R.C. and Sinclair-Prairie's No. 2 La Chusa is drilling below 2,500 feet without finding anything; Shumway's No. 3 Shiner, a few miles northeast of No. 2 La Chusa, has only started and Schimmel's No. 2 Wulf on northeast of that in McMullen County is down only 800 feet and drilling.

Starr County

Sun Oil Co.'s No. 1 Guerra in northern Starr County, about 15 miles north and slightly west of the Los Olmos shallow pool, found gas at 2,208-18 feet on a drill stem test. It looked like a 20,000,000-foot well and is setting casing to make a test. The Los Olmos Pool is the nearest production.

Bountiful rains in Starr County are responsible for a number of tests starting up again that have been idle. Great Plains Oil Co.'s No. 1 Sanchez, scheduled for a 4,500-foot test, has been hung up for weeks at about 2,250 feet waiting for water. Jeffries-Lambeth's No. 1 Starr County Cattle Co. was hung up at about the same depth and for the same reason. Both are now supplied with water and will begin to make hole. Several others are expected to start also.

B. & B. Oil Co.'s No. 1 Kelsey Bass, a little southeast of Rio Grande City, waiting for weeks to test a showing of gas at 4,520 feet, finally got a test last week after setting casing. It showed only a little gas and went in with tools to deepen a little and now has 320 feet of drill stem in the hole it is fishing for.

McMullen County

Loma Oil Co.'s (Jacob, Buzzini & Pickett) No. A-12 Jacob in the Jacob Pool is about a 100-bbl. well but not entirely complete and rig has been moved to No. A-13. Same company completed No. 1 Griffith for a 20-bbl. well about 3 miles north of the Jacob Pool, opening a new pool in that district at about the same depth as the other and some development will follow there.

Over Southwest Texas at this time practically everything is wildcatting and the only thing that looks like the possible development of a big new flush pool is the Greta Field in Refugio on the border between the Houston and San Antonio territory.

The new pool found by Marts & Beavens in Bastrop, the Moca Pool in northeastern Webb with three oil wells and two gas wells and a pipe line being laid to it, and the new Jacob Pool in McMullen are all due for development and will probably make nice little pools, but not get in the big class with Conroe and others.

John F. Camp late in the week was down 2,117 feet in his No. 1 King in the King Pool in Nueces County. The pool at this time consists of two gas wells and the next effort is to find some oil in connection with it.

If some oil is found in connection with the two gas wells in the Peters Pool in Duval County some quick development will of course follow there.

Wildcat Operations in Southwest Texas

Week Ending June 17

Company, farm and location—	Remarks:
ATASCOSA COUNTY	
A. Blume's No. 1 Shaw, 690 ft. from N line, 1,730 ft. from E line of 100-ac. tract in W. Farquhar Sur. No. 275	T.D. 1,628 ft.; S.D.
E. C. Burton's No. 1 Smith-Mowinkle, 2,100 ft. from N line, 200 ft. from W line of F. Perez Sur. No. 172.	Spudded in.
O. W. Killam's No. 1 Seitz, 1,700 ft. from NE line, 5,150 ft. from NW line of Cruz Landin Sur. No. 45.	T.D. 3,630 ft.; tested water; recementing.
BASTROP COUNTY	
Adams & Lyles' No. 1 Peter Goertz, 1,075 ft. from N line and 250 ft. from W line of 40-ac. tract in Andrew Mays Sur.	Rigging up.
J. E. Emanuel's No. 1 H. Klemm, 817 ft. from W line, 300 ft. from S line of tract in R. S. Teal Sur.	T.D. 263 ft.; standing.
Ca-Tex O. & G. Dev. Corp.'s No. 1 Harris, 150 ft. from NW line, 3,000 ft. from SW line of John Maxmillan Sur.	T.D. 2,016 ft.; S.D. for fuel.
Ca-Tex O. & G. Dev. Corp.'s No. 1 Pendergrass, 1,343 ft. from NE, 310 ft. from SE line of 130-ac. tract in Henry Warnell Sur.	Derrick.
Marts & Beavens' No. 2 Reyes, 640 ft. NE of No. 1.	T.D. 1,707 ft.; bailed 7 bbls. hrly.; going on pump.
BEXAR COUNTY	
Amsden & Foster & Amsden's No. 1 S. A. Irrig. Farms, 600 ft. E of Kinney Road, 1,500 ft. N of Elm Creek.	T.D. 1,136 ft.; laying water line.
C. I. Albertson's No. 1 Vogt, 2,100 ft. from N line, 240 ft. from E line of 237-ac. tract in Sec. 2 of S. McCollough Sur. No. 52	T.D. 906 ft.; set csg.
O. N. Boer's No. 1 S. W. Kearney, 150 ft. from S and E lines of 25-ac. tract in S. C. I. Peres Sur.	T.D. 1,170 ft.; set csg.; to test.
R. S. Boling's No. 1 J. J. Appelt, 150 ft. from N and W lines of tract in M. Uriegas Sur.	T.D. 830 ft; trying to get csg. on bottom.
E. R. Byrd's No. 1 W. H. Russell, 750 varas from NE line, 54 varas from NW line of Fernandez Rodrigues Sur.	T.D. 1,340 ft; standing.
C. J. LeCompte's No. 3 R. Diaz	T.D. 1,209 ft.; rigging up to deepen.
Austin Hull's No. 1 Classon, 265 ft. from W line, 2,500 ft. from S line of tract, 12 miles N of San Antonio.	T.D. 1,810 ft.; standing.
LaSalle Oil Co.'s No. 1 City Sewage farm, 150 ft. S of Rilling Road, 450 ft. W of NE cor. of tract in D. Bustillos Sur.	T.D. 55 ft.; setting surface csg.

(Continued on Page 121)

Conroe-Jackson Trend Test in Catahoula Parish, Louisiana, Blew in With Gas and Salt Water

By D. H. BANCROFT
Staff Correspondent, Louisiana-Arkansas

SHREVEPORT, La., June 19.—The first showing for commercial production of either oil or gas to be developed by any of the wildcats drilled during the current exploitation of the Conroe-Jackson trend in Louisiana was made when George Greer and others' No. 1 Louisiana Central Lumber Co., SW NE Section 2-9-6e, Catahoula Parish, blew in from a total depth of 2,744 feet with an estimated 15,000,000 feet of gas and 5,000 bbls. of salt water and only 340 feet of 10-inch casing set. The crew was coming out of the hole with core barrel when the well blew in with 10 fourbles of drill stem still in the hole. After blowing for approximately 12 hours it bridged and has been abandoned with the pipe left in the hole. A new hole will be drilled immediately offsetting. Location is on a 6,000-acre block which is part of a 40,000-acre block assembled by the operators, enough of which was sold to finance the test. Production is believed to be from the contact of the Cane River and the Wilcox (not the Oklahoma Wilcox), there being considerable argument among geologists as to whether the 4 feet of sand cored just before the blowout is the Cane River or the Wilcox. Some opinion is that it is from the same pay that is producing in the Urania Field of LaSalle Parish, 35 miles west, in which case it would be about 200 feet high, structurally.

Defining Converse Field

Southwestern limitation of the Converse Field in Sabine Parish, Louisiana, appears to be defined by Chief Oil Co.'s No. 1 Bowman-Hicks, SE NW Section 36-9-14, which cored 10 feet of salt water sand and was abandoned at 3,250 feet without having shown anything worth mentioning anywhere else on the way down. However, as Converse appears to be a chalk rock field much the same as Zwolle, this failure may not mean any more than a similar test does in Zwolle, 10 miles south, where whether or not a well is a producer depends upon whether or not it happens to hit a crack in the chalk. Meantime, Converse is recognized as a new producing district in North Louisiana by virtue of the fact that Standard Pipe Line Co. is building a 10-mile extension from its Zwolle gathering system into the area. The line will be 4-inch and should be completed and in operation within the next week or 10 days.

Ohio Oil Makes a Purchase

Other interesting developments of the week were announcement of purchase by the Ohio Oil Co. of Shaffer Oil & Refining Co.'s and Magnolia Petroleum Co.'s holdings in the Stephens Field of Columbia County, Arkansas. Consideration is not revealed but the properties transferred consisted of 42 wells having a total production of 120 bbls. from the Schaffer and 32 wells from the Magnolia with a total production of 85 bbls. together with all crude oil in both companies' lease tanks, the amount of which also was not released. Stephens Refining Co.'s plant at Stephens, built by W. B. Hassett, of the Imperial Oil Refining Co., of St. Louis, and associates, using equipment of the Kettle Creek Refining Co.'s El Dorado, Ark., plant, made a test run and shut down. They figure on running up to 500 bbls. per day of Stephens crude for local distribution of refined products. Another deal in the wind but not released in detail, is the reported purchase by Atlas Pipe Line Co. of Sparco Gasoline Corp., operating 20 filling stations in Shreveport.

Seven Other Completions

In addition to the two completions referred to there were seven others, five in Louisiana and two in Arkansas. Two of the Louisiana wells are gassers and the others dry holes. Both Arkansas wells were failures. Trapp Oil Syndicate's No. 1 Long-Bell Lumber Co., SE SW Section 26-2s-10, Beauregard Parish, at the opposite end of the Conroe-Jackson trend in Louisiana from the Catahoula Parish wildcat gasser, was abandoned as dry at 3,032 feet. In Bienville Parish, Texas Oil Co.'s No. 1 Lawson, NW NE Section 28-16-9, at Ringgold, was dry and abandoned at 1,025 feet without having gone deep enough to reach the gas developed in that area several years ago. Simplex Oil Co.'s No. 8 Youree-Randolph, NW SE Section 13-20-15, Shift Tail Lake area of Caddo Parish, where the Texas Co. and the Simplex developed quite a bit of oil several years ago, made 5,000,000 feet of gas from 2,266 feet. United Gas Public Service Co.'s No. 1 Lake Holt, NW SW Section 32-23-16, Rodessa deep gas area of Caddo, gauged 60,942,367 feet of gas at 2,300 pounds rock pressure from 5,742 feet. Mrs. A. L. Ibach's No. 1 Rambin, NE NE Section 32-11-11, southwest corner of DeSoto Parish, was dropped off the list as a dry hole at 3,527 feet. It had a small show of gas at 2,192 feet, a small oil show at 2,892 feet and blew out with gas from 2 feet of sand at 2,964 feet that tested dry and another show of oil at 3,054 feet that failed to respond to swabbing. Frank S. Craver and others' No. 2 Doniphan Lumber Co., SW SW Section 34-11-9, Cleburn County, Arkansas, in the Arkansas River Valley gas play of three or four years ago, was junked and abandoned at 3,750 feet. Howell and Green abandoned No. 1 Taafe, NW NW Section 25-12-32, Little River County, Arkansas, as a junked hole at 2,919 feet.

New Locations

Four new locations, all in Louisiana, were made during the week. Jensen, Mixon and Gutzler drove stakes for No. 1 Ledbetter, SW SE Section 6-18-11, Bossier Parish, approximately 8 miles southwest of the old Bellevue shallow field. Location is north and west of two previous wells drilled by Jensen and Rogers' in 1928 and 1929, one in Section 17-18-11, and the other in Section 7-18-11, the former salt water at 1,257 feet and the other salt water at 1,929 feet. Service Drilling & Royalties Corp.'s No. 2-B Gardner, SW NW Section 7-7-10, Zwolle district of Sabine Parish, began drilling June 9 and with 10-inch cemented at 41 feet was drilling at 670 feet. Dorcheat Syndicate began drilling No. 1 Good Pine Lumber Co., NE NE Section 35-22-10, Webster Parish, 6 miles northeast of Cotton Valley, June 7 and with 10-inch cemented at 160 feet was drilling at 2,000 feet. Location is 1,800 feet west and a little north of the same interests' No. 1 Pardee Co., drilled under the name of W. O. Blackman, trustee, in Section 36-22-10, which looked like a producer at 2,565 feet but developed salt water and was abandoned at 2,811 feet. Nemours Corp. made location for No. 2 Harrell, NW NE Section 7-20-4e, Union Parish, in the Monroe gas field.

Production by Pools

Daily average production for week ending June 17, follows:

NORTH LOUISIANA

	Bbls.
Caddo, light	4,685
Caddo, heavy	1,600
Cotton Valley	600
DeSoto-Red River	1,430
Elm Grove	335
Haynesville	3,925
Holly	210
Homer	2,700
Pleasant Hill	230
Sarepta-Carterville	800
Urania	2,000
Zwolle	6,470
Total	25,185
Previous week	25,325
Decrease	140

ARKANSAS

Champagnolle	1,360
El Dorado	2,590
Lisbon	400
Miller County	75
Smackover, light	2,595
Smackover, heavy	22,000
Stephens	375
Urbana	430
Total	30,320
Previous week	29,940
Increase	380
Both States	55,505
Previous week	55,265
Increase	240

Wildcat Operations in Louisiana-Arkansas

(Rotary operations unless otherwise designated)

North Louisiana

AVOYELLES PARISH

Company, well, farm name, section and block—	Remarks:
Gary Prevenson's (was Bud Harrell et al) No. 1 Haas, 330 ft. N and W, SE cor. SW SW Sec. 9-1s-3e	Derrick.

BIENVILLE PARISH

S. P. Borden's No. 1 Pardee, 550 ft. W, 250 ft. N, SE cor. SW NW Sec. 35-16-8	S.D. 120 ft.

BOSSIER PARISH

Cryer Oil Co.'s No. 1 fee, 2,400 ft. N, 1,080 ft. E, SW cor. Sec. 25-19-13	Cmtd. 6-in. csg. 852 ft; drilled plug; W.O.
A. W. Phillips, tr.'s No. 1 Oden, 300 ft. W, 150 ft. N, SE cor. NW NW Sec. 4-18-13	Set 6-in. with packer 1,607 ft.. bailed dry 1,714 ft; pulling csg.
B. A. Sherrell, tr.'s No. 1 fee, NE NW NW Sec. 18-19-11	Derrick.

CADDO PARISH

Nelson Oil Corp.'s No. 1 Taylor, 200 ft. N, 300 ft. E. SW cor. Sec. 13-18-14	S.D. 3,017 ft.

CLAIBORNE PARISH

United Gas Public Service Co.'s No. 1 Meadows, approximately 100 ft. S, center E½ E½ Sec. 13-21-5	Drlg. 6,057 ft.

DE SOTO PARISH

Bailey Gantz et al's No. 1 Jenkins, NW cor. SE SW Sec. 35-13-12	Cmtd. 6⅝-in. 2,900 ft; T.D. 3,069 ft.

RAPIDES PARISH

Evers & Collingsworth's (was A. G. Beck et al's) No. 1 Hickman-Simmons Lbr. Co., 330 ft. S, 330 ft E. NW cor. Sec. 40-4-1e	Drlg. 1,640 ft.

RED RIVER PARISH

Edward & Clay's No. 1 Delta Pecan Co., 1,600 ft. N, 450 ft. E, SW cor. Sec. 37-13-11	W.O.S.R. 2,470 ft.

SABINE PARISH

R. T. Henderson's No. 1 Sistrunk, 450 ft. N, 150 ft. W, C, Sec. 9-9-13	Showed oil, bailed dry, 2,079 ft.; S.D.
C. D. Loe, tr.'s No. 1 Whitney, 330 ft. N and W, SE cor. NW NE Sec. 19-9-14	Base chalk 2,107 ft; S.D., W 4s. 2,295 ft.

CONVERSE DISTRICT

Lambert et al's No. 1 Edwards, 300 ft. S and E, NW cor. SW NW Sec. 29-9-13	D.S.test 3,045-3,325 ft; S.W. and mud; W.O.
H. C. Lessenger's No. 1 Bowman-Hicks, 330 ft. S, 330 ft. E, NW cor. Sec. 13-9-13	S.D. 2,234 ft.
Joe Modisette's No. 3 Frost Lbr. Industries, 330 ft., S and E, NW cor. NE SW Sec. 16-9-13	Rigging up.

WEBSTER PARISH

Dorcheat Synd.'s No. 1 Good Pine Lbr. Co., 330 ft. S and E, NW cor. NE NE Sec. 35-22-10	Began drlg. June 7; cmtd. 10-in. 160 ft.; drlg. 2,000 ft.

Arkansas

COLUMBIA COUNTY

C. W. Alworth et al's No. 1 W. D. King, SW cor. SE SW Sec. 16-17-20	Cmtd. 10-in. csg. 38 ft.

DESHA COUNTY

T. J. O'Hara's No. 1 Martin, NW cor. NW SE Sec. 3-8-1e	Began drlg. May 8; S.D. acct of high wtr. and waiting for csg.; T.D. 140 ft.

(Continued on Page 121)

NORTH LOUISIANA

H. I. Morgan's No. 2 Smith, Section 22-19-11, structurally one of the deepest holes ever drilled in this territory, though its footage is considerably less than that of other deep tests, was drilling red sand at 4,523 feet. Location is on the south flank of the Bellevue Dome where, during the last three or four years, Morgan has drilled a series of wells, getting both gas and oil below the 400-foot horizon of Bellevue proper.

John F. Karper has leased a 6,000-acre block centering on Sections 26 and 27-16-14, Caddo Parish, 8 miles south of Shreveport on which he is obligated to start a 3,500-foot test on or before July 12. The acreage is just south of the McAnneny and Bird block on the outskirts of Cedar Grove, Shreveport's southern suburban section and west of another block of the same size 2 or 3 miles east in what might be called the southern part of the old Cedar Grove gas field developed in 1916-17. Nelson Oil Co.'s No. 1 Taylor, SW SE Section 13-18-14, a mile or so north of Shreveport's municipal airport on the edge of town, is

(Continued on Page 127)

Second Wet Gasser Reported in Pledger Field; Increase in Drilling in Gulf Coast District

By NEIL WILLIAMS
Staff Correspondent, Gulf Coast Fields

HOUSTON, Tex., June 19.—Completion by Danciger Oil & Refining Co. and Hamill Drilling Co. of their No. 2 Hunt, second well drilled by these operators at Pledger, northwestern Brazoria County, has resulted in another wet gasser very similar to the discovery well. The new producer was brought in Saturday from sand at 6,860-81 feet with the bottom in shale at 6,884 feet and showed a pressure of 1,800 pounds through a three-eighths inch choke on tubing. A total of 44 feet of 5½-inch screen was set with 213 feet of blank.

Location of this well is 185 feet west and 1,050 feet south of the discovery well, No. 1 Hunt, which was completed last November from the same sand at a total depth of 6,782 feet, with a pressure of 2,675 pounds and which has been yielding around 50 bbls. daily of light gravity distillate being marketed locally for tractor use. The high pressures, characteristic of these two wells, were handled successfully in both cases.

That the second well did not make an oil producer in view of the fact that the bottom 20 feet showed considerable saturation was a surprise to many but this did not lessen the importance of the area. It is generally believed that the high pressures are contributory to the failure to make "black" oil in each instance. Pledger has been looked upon as a field of considerable possibilities, being of the very deeply seated salt dome type.

The Pledger area figured in an important lease trade the past week with the purchase by Humble Oil & Refining Co. of a tract of approximately 200 acres in the Gray & Moore Survey from Maurice Hirsch and associates, this tract being east of the Danciger block. The reported consideration was $40,000, which is on a basis of $200 an acre. Humble also obligated itself to drill if production is brought within 2,000 feet of the tract and to continue development with one well to 20 acres if production is found. Humble and Gulf Production Co. jointly own a block adjoining the Danciger block on the west in Matagorda County and now are drilling their second deep test, No. 2 Pierce Estate, which at latest report was down 7,788 feet in sand.

Conroe Tests

Taking of production tests in the Conroe Field by the Railroad Commission was completed late in the week. The tests were made in 56 key wells, each of which was flowed for a period of 24 hours through a quarter-inch choke. The average flow of these wells was 504 bbls. The highest flow by any one well was 576 bbls. The tests were taken in view of a possible change in the present proration plan from a well-acreage basis to one taking potentials into consideration. The tests, however, did not show potentials but indicated only relative flows through a uniform choke. The excess production of these key wells will be charged against the allowables, the present allowable being 144 bbls. daily per well on 20 acres.

Harris County

H. H. Sloan's No. 1 Peden, Brock Survey, northern Harris County, 10 miles northeast of Magnolia Petroleum Co.'s No. 1 Kobs, Tomball discovery well, continues to hold the spotlight although it has been standing at 5,045 feet for the past 10 days. Ever since this wildcat indicated a decided reversal, leasing has continued active to the east and northeast. Aiken and associates are reported to have taken a block in the D. Garrett and Alex Smith Surveys, southern Montgomery County, 3½ miles north of the Sloan test, and are scheduled to start drilling by July 30 on the Rolph property. Southeast of the Sloan test, C. & C. Drilling Co. and Van Phail's No. 1 Erhardt, C. H. Delesdenier League, found the Hockleyensis at minus 5,105 feet (elevation 115 feet). There is little to determine whether this is normal or high with the Sloan test.

Southwest of the Tomball district in the J. Duckworth Survey, north of Cypress, Lavender & Smith are starting a wildcat, No. 1 Herman Teske, which will be watched closely. It is approximately 6 miles southwest of Magnolia's Kobs discovery. Magnolia still is making hole in its No. 1 Martens, Joseph House Survey, 3 miles north of the Kobs well. At latest report it was drilling sandy shale at 7,032 feet. This well found salt water in the 5,500-foot pay horizon. Magnolia's No. 1 Rudel is drilling shale at 1,800 feet. Humble Oil & Refining Co. is just starting up its three tests. Sinclair-Prairie Oil Co.'s No. 1 Kirmayer, Jesse Denton Survey, 10 miles west of Tomball, is nearing its obligated depth of 6,000 feet without uncovering anything of particular interest. In the Harris County School Land Survey, south of the Sinclair block, Melba Oil Co. is starting up its No. 1 L. B. House.

Brazoria County

Amerada Petroleum Corp. and Rycade Oil Corp.'s No. 3 Seaburn, discovery well at East Stratton Ridge, Brazoria County, has turned out a disappointment. Plugged back 20 feet from 4,500 feet, where it was completed several weeks ago, it produced some oil for a short time and then went to water. It originally flowed at the rate of 96½ bbls. an hour through a three-quarters inch choke, was pinched to a half-inch choke making 58 bbls. an hour but then started making water. When killed to plug it was flowing 30 bbls. of fluid, 40 per cent water.

Jefferson County

A decided increase in drilling activity was reflected generally over the Gulf Coast the past week. This included new work in Conroe and such fields and also a number of important wildcats. Chief of the latter possibly is the test being started by Sun Oil Co. on its block south of Nome in western Jefferson County. The test, the first on the block, is on the Paggi tract, 990 feet west and 1,610 feet north of the southeast corner of the T.&N.O. Survey No. 32 (J. W. Kirby Survey, Abstract 584). Derrick is up and rig is being moved in.

Huffman Dome Development Co. (Hamill & Smith) has made location for No. 1 E. M. House, Mary McGruder Survey, in the extreme northeast corner of Harris County, on a block recently taken. This area is approximately 9 miles northeast of the Humble Field and about 6 miles northwest of North Dayton, and is in that point where Harris, Montgomery and Liberty Counties join. In eastern Montgomery County, Fostoria Oil Co. is starting a test on the Foster Lumber Co. land in the southeast corner of the H.& T.B. Survey No. 2.

Wharton County

Pure Oil Co. is moving in a second rig on its Louise prospect in western Wharton County, where location has been made for No. 1 Charles T. Kuntze, Morris & Cummings Survey, Section 27. This is approximately a mile southeast of No. 1 Stewart, at latest report drilling in hard shale at 7,488 feet. The latter well has encountered a number of sands showing oil and gas and it is probable, judging from drill stem tests, that a well could have been made. An exploratory test, however, is being made, in view of the fact that Pure Oil Co. is obligated to drill seven additional tests immediately upon completion of the first producer.

Liberty County

Yount Lee Oil Co. has been trying to run a string of 7-inch casing in its No. 1 E. W. Boyt, H.&T.C. Survey, Section 17, southern Liberty County, which has a small showing of gas and oil in a sandy shale formation at a total depth of 9,256 feet. This is the second deep test drilled by this company on what is known as the Plummer prospect, this being on the Liberty-Chambers County line several miles east of the Hankamer Field. The first test, a few miles southeast in Chambers County, was drilled to 9,334 feet as the coast's deepest test. Gulf Production Co.'s No. 1 Crowe & Jacobs, a wildcat located between the Yount Lee test and the Hankamer Field, and which several weeks ago made a small well at 4,921 feet, now is drilling below 6,520 feet.

SOUTH LOUISIANA

Yount Lee Oil Co. is starting another deep test southeast of Jennings, Acadia Parish, Louisiana, this being No. 13 Housierre-Latrielle, 300 feet due east of No. 12, abandoned several weeks ago at 5,280 feet. Production has been found in this area around 7,400 feet in three tests although most development has resulted in failures.

At Roanoke, Jefferson Davis Parish, Humble Oil & Refining Co. has run a string of 6,559 feet of 9⅝-inch casing, one of the longest and heaviest strings of pipe of this size on the coast.

Abandonments the past week included C. G. Hamill's No. 1 McNair, William Harris Survey, east of the South Liberty Field, which was dry at 6,100 feet; Turnbull and associates' No. 1 Mauritz, John Davis Survey, at Ganado, Jackson County, dry at 6,039 feet; Kirby Petroleum Co.'s No. 1 Kirby Lumber Co., James Stevenson Survey, 10 miles southeast of the Livingston Field, dry at 5,304 feet.

Blowout at Greta

Greta, newly opened field in Refugio

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Gulf Coast Fields and Wildcats

Week Ending June 17

RACCOON BEND—AUSTIN COUNTY

Company, farm and location—	Remarks:
Goodnight and Donald Oil Co.'s No. 1 Deitrich, Thos. Bell Sur., 200 ft. SE Flannagan et al's No. 1 Deitrich	Tested S.W. 3,653 ft.

DAMON MOUND—BRAZORIA COUNTY

Sinclair Prairie Oil Co.'s No. 31-A Bryan, 155 ft. N, 45 deg. E of SW cor. of Blk. 28, Masterson Subd., and 140 ft. S, 45 deg. E A. Darst Sur.	T.D. 7,586 ft; no report.

MANVEL—BRAZORIA COUNTY

The Texas Co.'s No. 1-B Belcher, H. N. Little Sur., 300 ft. out of N cor. of "B" lease	T.D. 5,126 ft; 7-in. csg. 5,105 ft; drlg. plug.
The Texas Co.'s No. 2 Davis, 300 ft. out of S cor. Lot 42, H. N. Little Sur.	Gumbo 1,231 ft; cmtd. 10-in. csg. on bottom.
The Texas Co.'s No. 3 Ewing, H. N. Little Sur., 250 ft. from E line, 400 ft. from S line of Lot 30	Drlg. sand and boulders 1,997 ft.

BARBERS HILL—CHAMBERS COUNTY

Mills Bennett Prod. Co.'s No. 3-A "A" Wilburn (W.O.), Henry Griffith League	T.D. 5,232 ft; cmtd. to 4,916 ft.
Humble O. & R. Co.'s No. 2 Kirby (W.O.), Henry Griffith League	Sand 4,547-55 ft.; making D.S. test.
Sinclair Prairie Oil Co.'s No. 10 Wilburn (D.D.), Wm. Hodges Sur.	T.D. 5,172 ft; cutting and pulling screen.
Sinclair-Prairie Oil Co.'s No. 14 Wilbur (W.O.), Henry Griffith League	Coring 4,206 ft.
Sun Oil Co.'s No. 16 Wilburn, Henry Griffith League, 150 ft. W of No. 14 and 50 ft. N of S line	No report.
The Texas Co.'s No. 8 Wilburn (W.O.), Henry Griffith League	Drlg. shale 4,398 ft.
Yount Lee Oil Co.'s No. 20 Chambers County, Wm. Bloodgood Sur., 350 ft. from NW line and 50 ft. from SW line of lease	T.D. 4,782 ft.; sidetracking in shale 1,918 ft.
Yount Lee Oil Co.'s No. 21 Chambers County (W.O.), Wm. Bloodgood Sur.	Cmtd. hole to 1,874 ft.
Yount Lee Oil Co.'s No. 22 Chambers County, Wm. Bloodgood Sur., 200 ft. from W line, 2624 ft. from N line of lease	Drlg. salt 2,362 ft.

RABBS RIDGE—FORT BEND COUNTY

Cullen & West's No. 2 Whitmore, Samuel Kennedy Sur., 476 ft. W of No. 1 and 350 ft. N of S line	Sandy shale 5,339 ft; cmtd. 7-in. csg. 5,298 ft.
Gulf Prod. Co.'s No. 2 Edwards & Riggins, Samuel Kennedy Sur., 1,302 ft. N along W line and 316 ft. E at right angles	Comp. 57 bbls. per hour; ¾-in. choke, 5,300 ft.
Humble O. & R. Co.'s No. 1 R. A. Wolters, R. Peebles Sur., 325 ft. from N line, 500 ft. from E line	Drlg. shale 2,712 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 3 T. R. Booth, J. Rabb Sur., 865 ft. E of No. 7	Drlg. shale 5,080 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 17-A F. I. Booth, S. Kennedy Sur., 932 ft. E of No. 16	Drlg. gumbo 1,393 ft.
Humble O. & R. Co.'s No. 8 George, J. Rabb Sur., 1,-300 ft. E of No. 7	Pulling screen to deepen 5,410 ft.
Humble O. & R. Co. and Gulf Prod. Co.'s No. 19-A Lockwood & Sharp, J. Rabb Sur.	T.D. 5,300 ft; cmtd. 7-in. csg.
Humble O. & R. Co.'s No. 14-B Lockwood & Sharp, J. Rabb Sur., 500 ft. from E line, 302 ft. from S line	Comp. 56 bbls. per hour; ¾-in. choke, 5,300 ft.
Humble O. & R. Co.'s No. 8 Meyers, J. Rabb Sur.	Comp. 50 bbls. per hour; ¾-in. choke, 5,300 ft.

(Continued on Page 123)

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Possible Unitization of Drilling and Production Activities in Several of the California Fields

By L. P. STOCKMAN
Staff Correspondent, California Fields

LOS ANGELES, Calif., June 17.—Enactment of the Industrial Recovery measure has revived interest in the possible unitization of drilling and production activities in several California fields. Operators in the Kettleman Middle Dome Field recently completed preliminary steps preparatory to initiating unit operation and are definitely committed to unitization or some modified form of regulation. The possibility of unitization has already been discussed by operators in the Lost Hills and Belridge Fields, but nothing definite has been decided. Operators in these fields decided some time ago strictly to observe curtailment and refrain from further development of the highly productive Eocene which underlies the Temblor in this area. The Eocene has not yet been definitely proven productive in either the Southern Belridge or Lost Hills Fields due probably to the absence of aggressive development. Associated is drilling a deep test in Lost Hills in conjunction with Richfield for the specific purpose of determining the productivity of the Temblor and Eocene in that field. If substantial production should be developed, it will undoubtedly lead to a concerted attempt to unify drilling and production activities.

Elwood

Operators in the Elwood Field have tentatively agreed on the advisability of unitizing drilling and production activities. E. B. Reeser, president of Barnsdall, sponsored a movement to unify operations in the Elwood Field of Santa Barbara County some two years or so ago, but operators were unable to reach an agreement at that time. At the last session of the California legislature, representatives passed an enabling bill to facilitate formulation of definite plan to unify operations. This measure, Assembly Bill No. 1416, was signed a few days ago by Governor Rolph and paves the way for unit development if operators can reach a definite agreement. Under this measure, operators holding tideland leases may unite with each other and if necessary with owners of upland property in adopting and operating under a unit plan of development covering the entire field whenever the chief of the Division of State Lands determines and certifies such action is necessary or advisable in the public interest. The bill also provides for a compensating royalty from the operators of wells on lands draining state lands and removes a number of ambiguous and meaningless restrictions now in the law covering the acreage held by tideland operators. Definite action on unitization in the Elwood Field will be held in abeyance until the provisions of the Industrial Recovery act are more fully understood and the policy of the Federal Government determined. Present production from the Elwood Field is coming from the Vaqueros formation entirely, as a gentlemen's agreement among the respective operators precludes development of the underlying Sespe.

Barnsdall and Rio Grande definitely proved the Sespe as productive but immediately shut in the well to encourage effective curtailment. The most important factor to be determined by Elwood operators in sponsoring unit development is the advisability of limiting it to the Sespe rocks or inclusion of both the Vaqueros and the Sespe within the scope of operations. The principal stumbling block is not so much the number of acres involved but rather an equitable distribution of present production and the establishment of each operator's equity. This is particularly true of operators holding acreage on the apex of the structure as differentiated from production developed out on the flanks.

In the formation of the unit plan covering the Kettleman North Dome Field, the amount of production acreage had not been determined and the matter was relatively simple after operators had agred upon a minimum and maximum amount of productive acreage. In the case of Elwood the outer limits of commercial production have been definitely determined, with the result that current production and possible ultimate recovery is a dominating factor rather than the intangible amount of acreage involved. There are a number of other areas in California susceptible to unit development and steps are expected to be undertaken. These areas include Inglewood, Dominguez and San Miguelito. Unit operation might ultimately be extended to include possible deeper productive horizons in a number of California fields where lower virgin zones might normally be anticipated.

Curtailment Committee

The outcome of conferences in Chicago to perfect a code of ethics and the plan to be followed by the Federal Government with respect to enforcement of the industry's control bill may have a decided effect on curtailment work in California especially in view of the fact that this state does not have adequate legislation to effect compulsory regulation of production. The situation is further complicated because none of the several pipe line systems extend beyond the limits of the state and also because a number of independent refiners do not engage in either interstate or export shipments of crude or refined oils. California operators, nevertheless, recognize the advisability and necessity of limiting production to normal requirements and have stimulated curtailment work.

In a state-wide election of oil operators, the California oil industry recently elected a new central proration committee. Operators in each of 18 districts of the state recently elected a chairman and vice chairman for each designated group of fields. The chairman of each field will represent that field or group of fields and automatically become a member of the central proration committee. As a result of this election, the Coalinga Field will be represented by L. P. St. Clair, chairman, and W. S. Fisher, vice chairman; Kettleman Hills by William Reinhardt and F. E. Rehm; Lost Hills-Belridge by R. A. Sperry and Claude Coleston; Buena Vista-Elk Hills by R. R. McGuire and R. I. Brown; Midway Sunset and McKittrick by H. F. Owen and J. B. Wells; East Side San Joaquin Valley by Lloyd Williamson and Max App; Santa Barbara County by R. A. Broomfield and A. C. Rubel; Ventura County by H. P. Grimm and L. A. Cranson; Los Angeles-Inglewood by J. A. Bermingham and P. C. McConnell; Playa Del Rey by Laurence Kelly and Elmer Bolton; Dominguez by J. U. Stair and J. A. Jones; Rosecrans, Torrance and Lawndale by Joseph Jensen and W. C. Whaley; Long Beach by William Reid and Bruce Barkus; Seal Beach and Alamitos Heights by H. H. Bell and H. K. V. Tompkins; Santa Fe Springs by W. H. Geis and Emil Kluth; Montebello and West Coyote by Warner Clark and Charles Drader; Brea-Olinda and Richfield by L. Vander Leck and V. H. Wilhelm, and Huntington Beach by Neal Anderson and A. M. Anderson. The first named in each district is the chairman and member of the central proration committee.

Huntington Beach

Southern California Drilling Co. completed No. 2 Severns, in the Huntington Beach town lot area early in the week, flowing 780 bbls. of exceptionally clean 24.9 gravity oil and 1,400,000 feet of gas per day from 4,405 feet. It was finished with a 7-inch liner carrying 631 feet of perforated and 4,325 feet of 3-inch tubing with packer set at 3,695 feet. New work being started in the Seventeenth Street town lot area is somewhat lower than anticipated due possibly to the fact that a number of operators have taken over upper zone producers to secure the advantage of the pipe in the hole and 2,000 or 3,000 feet of hole already made. Several wells were landing whipstocks in the town lot area during the week and another 15 days may show several completions. Two new locations were staked at Huntington Beach, Beloil Corp.'s No. 1 Huntington and Lindberg-Laughlin's No. 1.

Plymouth Oil Co. succeeded in recompleting No. 10 Signal in the Long Beach Field pumping 371 bbls. of 25.6 gravity oil per day from 6,961 feet. This well, brought in under a natural flow several months ago, died last week and pumping equipment was installed. Plymouth's No. 10 Signal was recompleted under a natural flow a few months ago after the hole had been plugged back from 6,961 feet to 5,070 feet. Dabney-Johnston Oil Corp. recompleted No. 21 Signal pumping 101 bbls. of 25.2 gravity oil per day after plugging back the hole from 6,253 feet to 5,310 feet and perforating the 5¾-inch at 5,110-5,250 feet. In the Rosecrans Field of Los Angeles Basin, Cypress Petroleum Co. has landed and cemented a string of 4¾-inch casing in No. 3 Higgins at 5,660 feet and drilling operations are expected to be resumed during the week. No. 3 Higgins has been redrilled and deepened from the upper zone and is expected to be recompleted in the Trust, or Gordon, zone. The outcome may be the determining factor in the amount of development to be undertaken in the Rosecrans Field in the immediate future, because if substantial production is developed Barnsdall, Union and other operators may be obliged to redrill and deepen a number of upper zone producers. The Trust, or Gordon, zone was logged last year in No. 2 Trust of Barnsdall Oil Co. and while the well was finished doing approximately only 100 bbls. per day, this was considered fairly promising as No. 2 Trust was in the extreme western part of the Rosecrans Field. Due to the small diameter of the hole in No. 3 Higgins of Cypress Petroleum Co., this well may not reflect the true potential of the sand under normal conditions. It should throw some light on the productivity of the Gordon, or Trust, zone.

San Miguelito

Developments in the San Miguelito Field of Ventura County were far from encouraging as two wells are running several hundred feet deeper than anticipated. Honolulu Consolidated was still in brown shale at 6,710 feet without favorable indications. This well, with a surface elevation 300 feet lower than No. 1 Grubb of the Continental, does not look any too promising although it is not yet out of the running by any means. No. 2 Grubb of the Continental, approximately midway between Continental's No. 1 Grubb, a commercial producer flowing 1,150 bbls. per day, and No. 1 Valenzuela of the Honolulu, is in a barren sand at 6,708 feet without any favorable indications. This well passed out of the brown shale into a sand at 6,705 feet but the sand is apparently barren as it fails to show any reaction to either the ether or acetone test. Neither No. 2 Grubb of the Continental nor No. 1 Valenzuela of the Honolulu has logged the upper zone found in No. 1 Grubb, indicating that both wells are structurally lower than Continental's deep zone discovery, No. 1 Grubb.

Chanslor-Canfield Midway Oil Co.'s No. 3-A Hobson in the San Miguelito Field is at 4,073 feet, but is not yet deep enough to permit accurate correlation with Continental's deep zone completion.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	June 2		May 27			
	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Intercoastal-domestic—						
Crude oil	.....	.....	.....	.....	78,085	.....
Fuel oil	69,035	9,862	.....	.....	732,704	.....
Diesel and gas oil	.....	.....	.....	.....	1,085,064	116,890
Gasoline	73,656	10,522	289,777	41,397	3,525,961	3,110,895
Kerosene	.....	.....	5,978	854	417,054	103,895
Foreign exports—						
Crude oil	111,012	15,859	140,459	20,065	3,164,472	4,042,599
Fuel oil	195,302	27,900	226,766	32,395	3,223,284	4,081,302
Diesel and gas oil	67,590	9,642	61,825	8,832	1,529,382	1,132,314
Gasoline	193,552	15,507	56,651	8,093	2,624,277	4,227,279
Kerosene	29,487	4,212	.....	.....	822,813	1,035,390
Naphtha distillates	.....	.....	.....	.....	.....	75,425
Coastwise-domestic—						
Crude oil	.....	.....	64,310	9,187	4,264,249	6,182,153
Fuel oil	272,049	38,864	187,003	26,715	4,351,827	5,720,673
Diesel and gas oil	11,959	1,708	91,444	13,063	659,205	661,801
Gasoline	201,838	28,120	145,450	20,779	5,181,520	6,887,753
Kerosene	5,539	791	7,881	1,126	95,618	75,475
Naphtha distillates	.....	.....	.....	.....	27,651	.....

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic—						
Diesel and gas oil	.....	.....	.....	.....	280,531	151,220
Gasoline	.....	.....	12,175	1,739	500,966	368,230
Kerosene	.....	.....	.....	.....	482,430	.....
Lubricants	.....	.....	.....	.....	16,490	15,824
Foreign exports—						
Crude oil	76,225	10,889	97,850	13,979	831,722	707,651
Fuel oil	.....	.....	46,780	6,683	299,291	521,639
Diesel and gas oil	89,950	12,850	.....	.....	582,129	352,107
Gasoline	85,302	12,186	150,527	21,504	1,935,217	1,716,159
Kerosene	18,450	2,636	42,200	6,029	449,883	491,863
Lubricants	.....	.....	5,679	811	31,926	24,934
Coastwise-domestic—						
Fuel oil	77,402	11,057	.....	.....	1,329,093	1,189,009
Diesel and gas oil	.....	.....	.....	.....	166,162	221,583
Gasoline	39,559	5,651	176,126	25,161	1,555,308	1,461,619
Kerosene	13,101	1,872	.....	.....	70,632	63,596
Lubricants	.....	.....	.....	.....	2,751	.....

The topography of the San Miguelito Field is quite irregular and very rough, indicating a probable unconformity in subsurface conditions. Operators in this field cannot locate new wells at regular intervals, as the hilly topography in most instances determines the location where new wells may be started. The upper several hundred feet of formation in the San Miguelito Field consists of sand and loosely consolidated gravels. This renders selection of drilling sites difficult as due consideration must be given to the possibility that earth slides may be a determining factor from a cost standpoint. In drilling No. 3-A Hobson of the Chanslor-Canfield Midway Oil Co. the excavation contractor expected to remove approximately 15,000 cubic yards of earth for the road and site to be provided for the rig. The contractor actually moved 91,000 cubic yards of earth and toward the end of the job kept two steam shovels on hand as one shovel was kept in readiness to dig out the other which frequently became buried in sand slides. The failure of No. 2 Grubb of Continental and No. 1 Valenzuela of the Honolulu to pick up the top zone in the San Miguelito Field is undoubtedly due to the absence of this zone, as both wells are relatively vertical. This was not the case with the Chanslor-Canfield Midway Oil Co.'s initial test in the San Miguelito Field, as it drifted more than 2,000 feet from the vertical and drilled entirely through the fault. Due to a downward displacement in the north end of the structure, Chanslor-Canfield Midway Oil Co. found the upper zone before drilling through the fault and then encountered it again after drilling through the fault. This condition resulted in the company finding almost a solid oil sand from approximately the 6,000-foot level to 10,000 feet and yet the well failed to show a sufficient accumulation of gas to result in a natural flow.

Mountain View

Shell has started rig construction for No. 2 Porter Day, a direct offset to Dana Hogan's No. 1 Wharton, a recent completion in the Mountain View Field of Kern County. Barnsdall has staked six locations in the Mountain View Field but it is problematical whether immediate drilling is contemplated. On one of these leases, Barnsdall is obligated to have a well under way within 90 days, but in most of the other leases the company has several months in which to begin drilling. This work may of course be speeded up if drilling operations should be undertaken on adjacent acreage. Barnsdall and the Geophysical Surveys, Inc., are shooting practically all of the Barnsdall's acreage in the Mountain View Field to determine the geophysical characteristics of the area. The outcome of this work will be correlated with subsequent developments and should establish the accuracy of geophysical work in California.

Mechanical surveys of subsurface conditions have not been especially pronounced in California but the efficiency of geophysics and seismological work may become of more importance with further experience. As a matter of fact, the Mountain View Field of Kern County was located by geophysics but apparently disproved by actual drilling operations. After Shell's exploration work the area remained relatively inactive until Dana Hogan moved into the area and completed a commercial producer flowing 2,700 bbls. per day. The completion confirmed the geophysical survey, although some doubted the accuracy of the findings of the instruments. Geophysical work now being conducted in the Mountain View Field should prove of paramount importance as it may furnish the basis for future correlation. In other words, if similar tests are conducted in other San Joaquin Valley fields with like results the importance of geophysical exploration will become recognized and encounter less opposition. Work up to the present time has been more or less unsatisfactory due to the failure to appreciate local conditions especially out in the floor of the valley. If wells are shot at the water table they should show a greater degree of accuracy as the sand and gravel above the water table is a poor conductor and may not consequently reflect true subsurface conditions.

Kettleman Hills

North Kettleman Oil & Gas Co. is still held up with mechanical trouble in No. 1 Lillis-Welsh, deep test in the extreme western part of the Kettleman North Dome Field, but some little progress was reported during the past week. The company, under the personal supervision of Ed McAdams, has been endeavoring to recover the fish in the bottom of the hole and approximately 100 feet of drill pipe has been recovered. This well is being held up with a rather complicated fishing job as the company has not yet located where salt water has been entering the hole. If the premature explosion which occurred last week blew a hole in the water string above the shutoff, the situation may be rather simple, whereas if the salt water is coming from the bottom of the hole it will be complex. It is difficult to estimate the probable future status of No. 1 Lillis-Welsh as much depends upon the effectiveness of the water shutoff on the 7-inch and the ability of Ed McAdams and his crew to remove or sidetrack the fish. For this reason the importance of No. 1 Lillis-Welsh will remain more or less conjectural pending future progress. Four wells have encountered water trouble in the Kettleman North Dome Field during the past few weeks but it is unlikely this condition will become general. In the case of Associated's No. 3 Whepley, the water trouble may be due to edgewater as the property is well out on the north flank. In Kenda's No. 21-1-P and Standard's No. 8-21-J it appears probable bottom water has been encountered due to too deep drilling. In the case of No. 6 Huffman of Superior Oil Co., the water trouble may possibly be due to mechanical conditions as the company landed a series of blank and perforated liners at alternate intervals. As far as the field itself is concerned, no serious water problem has yet been encountered.

Doyle Petroleum Co. wrote finis to exploration work in the Coal Oil Point district of Santa Barbara County by filing an abandonment notice on No. 3, on the Bolsa Chica Oil Co.'s tideland permit No. 191. The abandonment of this hole will probably bring tideland development in this area to a conclusion, although another well or two may possibly be drilled on the Campbell acreage inside the tide line. There are two wells under way in the Elwood Field, No. 10 on tideland permit No. 89, and Caroline Spalding's No. 7 on tideland permit No. 93, which should be completed within another several weeks. In the Goleta district Standard Oil Co. will attempt to develop oil or gas production on the Chase and Bryce property adjoining the More Ranch of the General Petroleum, with the development of gas production more probable.

Richfield

Drilling operations showed a little increase in the Richfield district of Los Angeles Basin during the past week due to the erection of three new rigs and the staking of one new location. The new rigs erected were for wells to be drilled by the Long Beach Petroleum on the Mann property, J. O. Seeple on the Breen lease and George Thomas on the Group lease. Long Beach Petroleum's No. 1 was formerly No. 2 Mann of the Associated, Seeple's No. 1 Breen formerly Associated's No. 2 Breen and George Thomas' No. 1 was formerly General Petroleum's No. 2 on Group Four. Otis Hoyt's No. 15, a recent completion, has settled to a steady flow of 400 bbls. per day from 3,777 feet and will probably hold steady at this rate for several weeks.

In the Montebello Field Universal Consolidated Oil Co. has indefinitely suspended drilling operations on No. 1 Cruz, a deep test in the extreme eastern part of the structure at 6,311 feet. This well, a projected deep Miocene test, was stopped in the brown shale after passing through the upper zone. It is probable Richfield was afraid of precipitating a deep zone exploitation program in the Montebello Field if this well should be completed. In the Dominguez Field Sunrise Petroleum Co. has about concluded rigging up No. 1 Domingues on acreage around the edge of the structure.

Midway-Sunset

Honolulu Consolidated Oil Co.'s No. 54 in the Midway-Sunset Field of Kern County, Section 8-32-24, pumping 102 bbls. of 26.1 gravity oil cutting 5 per cent from 3,281 feet. General Petroleum has resumed drilling operations in the McKittrick Field following the landing and cementing of a string of 8⅝-inch in No. 1 Lovitt, located on an independent structure, and is nearing the 1,000-foot level. Hub Oil Co.'s No. 1 in the Gould Hills district of Kern County is being watched by operators as a number of prominent geologists are of the opinion this well is in the Eocene. The Temblor was encountered around the 4,900-foot level and while showings have been logged from time to time they were not deemed of sufficient importance to justify a production test. The Texas Co. recently staked location for a new wildcat in the Pico area of Los Angeles Basin.

CANADIAN CRUDE PRODUCTION

CHATHAM, Ontario, June 17.—Official figures issued from Ottawa show that in April some 84,974 bbls. of crude petroleum were produced from all Canadian fields, compared with 87,218 bbls. in March and 95,585 bbls. in April, 1932. Production for the first four months of 1933, totaling 328,057 bbls., was 13.9 per cent below the same period of 1932.

MRS. ELMYRA McKAIG DIES

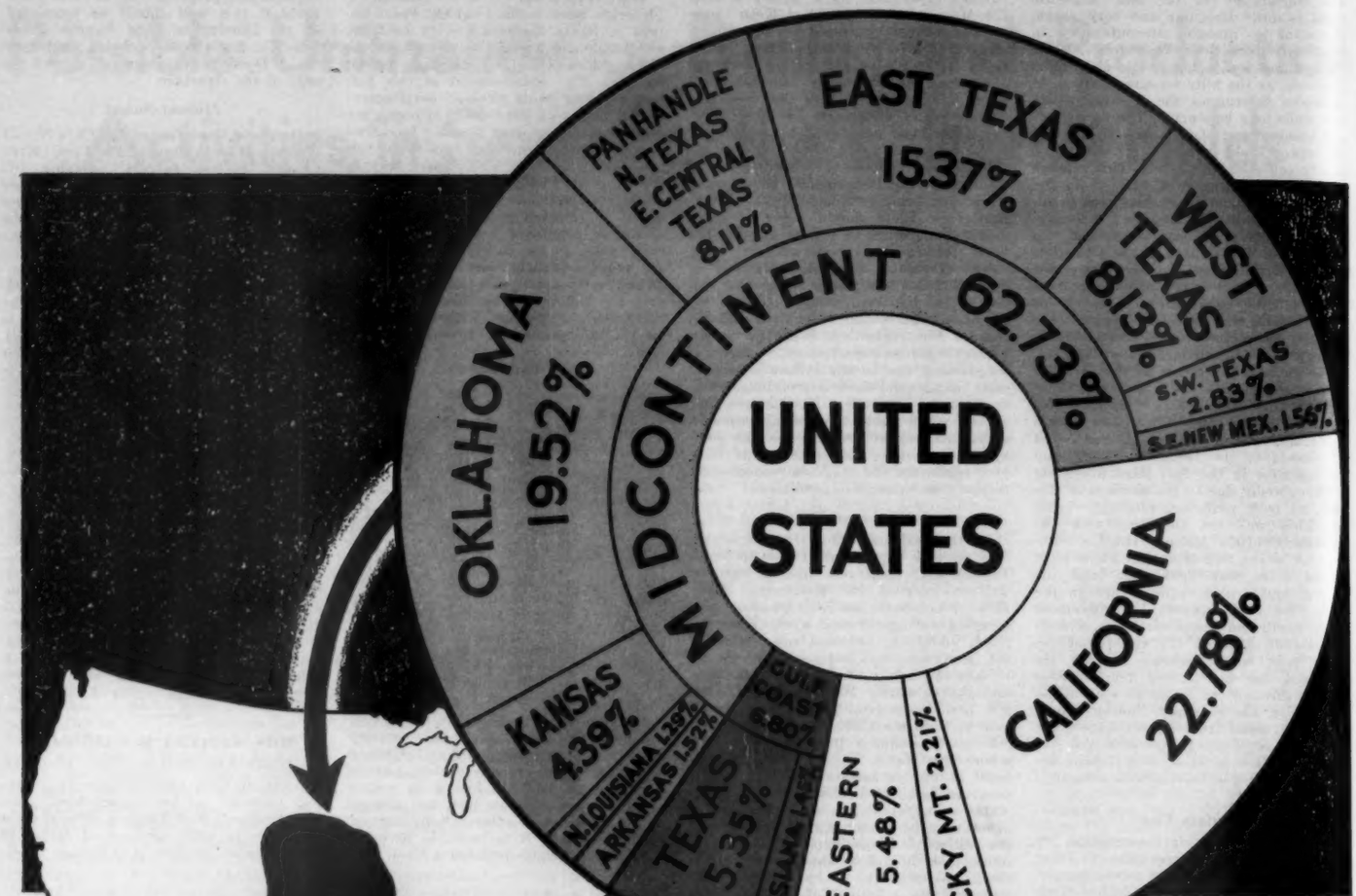
CHATHAM, Ontario, June 17.—Mrs. Elmyra McKaig died recently at Petrolia, Ontario, in her eighty-third year. Her husband, Neil McKaig, who died in Australia in 1929, was an oil driller in the Bothwell, Petrolia, and foreign fields.

IMPORTANT SOUTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Palm Ridge Oil Co., No. 1 Palms, Los Angeles Co.	2- 2-15	5,350	suspended
Baldwin Oil Co., No. 9 Inglewood, Los Angeles Co.	7- 2-14	5,862	suspended
Kupfer, A. M., No. 1 Inglewood, Los Angeles Co.	17- 2-14	5,853	plug bottom
Pacific Gulf, No. 1 Athens, Los Angeles Co.	19- 2-13	6,094	suspended
Pacific Oil Inv. Co., No. 1 Wilmington, Los Angeles Co.	28- 4-13	3,640	pull tubing
Wilmington Oil Co., No. 1 Wilmington, Los Angeles Co.	28- 4-13	3,646	cleaning out
Sunrise Pet. Co., No. 1 Domingues, Los Angeles Co.	3- 4-13	rig	rigging up
Peoples Oil & Gas Co., No. 1 Compton, Los Angeles Co.	31- 3-12	rig	rigged up
Oakes & Mead, No. 1 Lyndwood, Los Angeles Co.	31- 2-12	4,940	cleaning out
The Texas Co., No. 1 Pico, Los Angeles Co.	13- 2-12	rig	rigging up
Community Oil Co., No. 1 Montebello, Los Angeles Co.	34- 1-11	5,215	hd. sd. drilling
Universal Consd., No. 1 Montebello, Los Angeles Co.	5- 2-11	6,311	suspended
Andrus & Hutcheson, No. 1 El Monte, Los Angeles Co.	11- 1-11	1,792	suspended
Signal Pet., No. 1 Puente, Los Angeles Co.	14- 2-10	4,808	will deepen
Willetts Pet., No. 1 Saugus, Los Angeles Co.	35- 5-16	2,074	suspended
Smith, J. A., No. 1 Saugus, Los Angeles Co.	32- 5-11	3,515	suspended
Alpha Oil Co., No. 1 Calabasas, Los Angeles Co.	22- 1-18	1,199	suspended
Hudson Pet., No. 1 Newhall, Los Angeles Co.	1- 3-16	1,565	bailing
Ball, W. T., No. 1 Newhall, Los Angeles Co.	34- 3-16	3,582	suspended
Big Four Oil Co., No. 1 Newhall, Los Angeles Co.	32- 4-16	2,230	suspended
Marble, Willard, No. 1 Van Nuys, Los Angeles Co.	6- 2-16	2,000	suspended
Nuoli Co., No. 1 Newport, Orange Co.	29- 6-10	3,901	suspended
Mineral Exploration, No. 1 Capistrano, Orange Co.	8- 8-7	4,302	suspended
Saddleback Oil Co., No. 1 El Tora, Orange Co.	3- 6-7	78	sd. drilling
Placentia Dev. Co., No. 1 Placentia, Orange Co.	31- 3-9	rig	rigged up
Spindletop Oil Co., No. 1 Salton Sea, Riverside Co.	25- 7-10	3,590	suspended
Keeley, H. J., No. 1 Corona, Riverside Co.	21- 4-6	704	suspended
Great American Pet., No. 1 Chino, San Bernardino Co.	18- 2-8	2,340	hd. sd. drilling
Great American Pet., No. 2 Chino, San Bernardino Co.	18- 2-8	116	sd. sh. drilling
McCarthy, C. F., No. 1 Chino, San Bernardino Co.	14- 3-6	103	sd. sh. drilling
Mason Oil Co., No. 1 Salton Sea, Imperial Co.	1-17-15	680	suspended

IMPORTANT NORTHERN CALIFORNIA WILDCATS

Company, well and location—	S.T.R.	Depth	Status
Fairview Oil Co., No. 1-A Purisima, Santa Barbara Co.	18- 7-34	1,694	suspended
Standard Oil Co., No. 1 Goleta, Santa Barbara Co.	20- 4-28	rig	rigged up
Duell, O. S., No. 1 Naples, Santa Barbara Co.	7- 4-29	5,122	suspended
Bolsa Chica, No. 1 Coal Oil Point, Santa Barbara Co.	tideland	4,089	suspended
Bolsa Chica, No. 2 Coal Oil Point, Santa Barbara Co.	tideland	4,143	abandoning
Cuyama Oil Co., No. 1 Cuyama, Santa Barbara Co.	12-10-27	2,287	suspended
Woodrow Pet., No. 1 Rincon, Ventura Co.	4- 3-24	7,292	prod. test
Indian Pet., No. 1 Rincon, Ventura Co.	tideland	3,484	prod. test
Bardeen Pet., No. 1 Fillmore, Ventura Co.	18- 4-19	2,750	redrilling
Hancock Oil Co., No. 1 Fillmore, Ventura Co.	18- 4-19	1,362	sd. sh. drilling
Kneiper & Atha, No. 1 Barsdale, Ventura Co.	7- 3-19	270	sd. drilling
Honolulu Consolidated, No. 1 Miguelito, Ventura Co.	28- 3-24	6,670	hd. sh. drilling
Continental, No. 2 Miguelito, Ventura Co.	22- 3-24	6,500	sd. sh. drilling
C.C.M.O., No. 3-A Miguelito, Ventura Co.	23- 3-24	4,073	hd. sd. drilling
Midlands Pet., No. 1 Ojai, Ventura Co.	9- 3-23	7,210	suspended
Struve, R. E., No. 1 Ojai, Ventura Co.	12- 4-22	....	location
Wilshire Oil Co., No. 1 Sulphur Mountain, Ventura Co.	20- 4-21	1,862	redrilling
Mosher, J. W., No. 1 Santa Paula, Ventura Co.	22- 4-21	1,240	gr. sd. drilling
Petro Producing Co., No. 1 Timber Canyon, Ventura Co.	18- 4-20	4,661	hd. sd. drilling
Las Posas Pet., No. 1 Las Posas, Ventura Co.	22- 3-20	3,979	suspended
Wilshire Oil Co., No. 1 Barsdale, Ventura Co.	12- 3-20	1,732	suspended
International Oil Developers, No. 1 Conejo, Ventura Co.	33- 2-20	2,770	cleaning out
Hub Pet. Co., No. 1 Gould Hills, Kern Co.	22-29-21	6,180	gr. sd. drilling
Purman, T. H., No. 2 Gould Hills, Kern Co.	27-29-21	335	suspended
General Pet., No. 1 McKittrick, Kern Co.	10-30-21	972	sd. sh. drilling
Casa Mira Oil Co., No. 1 Belridge, Kern Co.	29-28-20	2,570	br. sh. drilling
General Pet., No. 1 Belridge, Kern Co.	20-28-21	8,260	suspended
Milham Exploration Co., No. 24 Buttonwillow, Kern Co.	5-28-22	2,625	suspended
Cumberland Oil Co., No. 2 Devils Den, Kern Co.	17-26-18	3,270	suspended
Holloway, A. S., No. 1 Devils Den, Kern Co.	11-26-18	1,848	suspended
Lincoln Pet., No. 1 Devils Den, Kern Co.	10-26-18	1,456	gr. sd. drilling
Hanna, Tom, No. 1 Devils Den, Kern Co.	26-26-18	3,516	suspended
Pyramid Hills Oil Co., No. 1 Devils Den, Kern Co.	24-26-18	3,966	br. sh. drilling
Fowler, F., No. 1 Blackwell Corner, Kern Co.	15-26-19	3,170	suspended
Rio Cal Pet., No. 1 Shale Hills, Kern Co.	2-27-18	2,355	suspended
Associated, No. 1 Lost Hills, Kern Co.	2-26-20	4,313	br. sh. drilling
Caravel Pet. Co., No. 1 Edison, Kern Co.	19-30-30	1,801	sd. sh. drilling
Shell Oil Co., No. 1 Mountain View, Kern Co.	29-30-29	....	grading
Bankline Oil Co., No. 1 Mountain View, Kern Co.	4-31-29	mtl.	building rig
Barnsdall Oil Co., No. 1 Mountain View, Kern Co.	31-30-29	....	location
Barnsdall Oil Co., No. 2 Mountain View, Kern Co.	32-30-29	....	location
Barnsdall Oil Co., No. 3 Mountain View, Kern Co.	30-30-29	....	location
Barnsdall Oil Co., No. 4 Mountain View, Kern Co.	31-30-29	....	location
Descanso Oil Co., No. 1 Wheeler Ridge, Kern Co.	31-11-19	2,620	suspended
Gatton & Luethe, No. 1 Madera, Madera Co.	22-10-17	2,390	sd. sh. drilling
Bergman, Harry, No. 1 Kingsburg, Fresno Co.	12-12-21	4,148	to set pipe
Graham & Loftus, No. 1 Raisin City, Fresno Co.	20-15-18	5,780	sd. sh. drilling
Emerich Oil Co., No. 1 Mendota, Fresno Co.	35-13-13	3,211	sd. sh. drilling
Hogan, Dana, No. 1 Joaquin Ridge, Fresno Co.	28-20-16	2,914	sd. sh. drilling
Kent & McDonald, No. 1 Carrizo Plains, San Obispo Co.	3-32-22	3,830	suspended
Paso Robles Oil Co., No. 1 Edna, San Luis Obispo Co.	27-27-11	4,191	suspended
Guess, E. B., No. 1 Corcoran, Kings Co.	7-21-21	6,197	suspended
Brown, A. M., No. 1 Cloud, Kings Co.	10-23-19	1,205	recemented
Brown, A. M., No. 2 Cloud, Kings Co.	10-23-19	mtl.	building rig
Dudley Dome Oil Co., No. 1 Dudley Ridge, Kings Co.	9-23-20	3,012	suspended
Knudsen & Schmidt, No. 1 Reef Ridge, Kings Co.	36-23-17	6,878	suspended
Kettleman Ridge Oil Co., No. 1 Avenal, Kings Co.	10-23-16	312	suspended
Magee & Stone, No. 2 Alpaugh, Kings Co.	33-24-22	2,570	bl. sh. drilling
Dil-Harp Oil Co., No. 1 Delano, Tulare Co.	25-24-26	1,210	cleaning out
Na-Pa Oil Co., No. 1 Griffith, Napa Co.	7- 8-5	3,742	br. sh. drilling
Oakdale Oil Co., No. 1 Oakdale, Stanislaus Co.	5- 2-10	4,815	hd. sh. drilling
Pacific Northern Oil Co., No. 1 Guinda, Yolo County	23-12-3	3,430	gr. sd. drilling
Buttes Oilfields Co., No. 1 Marysville, Sutter Co.	35-16-1	2,731	gas—shut in
Buttes Oilfields Co., No. 2 Marysville, Sutter Co.	34-16-1	1,160	sd. sh. drilling
Tehama Pet. Co., Well No. 1, Glenn Co.	4-22-5	4,550	gr. sh. drilling
Orland Synd., No. 1 Orland, Tehama Co.	31-23-3	3,748	suspended
Marker Drlg. Co., No. 1 Orland, Tehama Co.	21-25-3	3,030	suspended



MIDCONTINENT: 62.73% OF U. S. OIL
. . . GULF COAST: 6.80% OF U. S. OIL

The Midcontinent oil area produces 62.73% of the nation's petroleum. California produces 22.78%. The Rocky Mountain, Eastern and Gulf Coast areas combined, produce 14.49%.

Is it surprising that Tulsa, centrally situated in the Midcontinent, and the hub, not only of Midcontinent but of national oil activities,—is the "Oil Capital of the World?"

The great majority of companies operating in the Midcontinent have their operating headquarters at Tulsa. For many years production activity has continually shifted about, within this area. But the oil companies do not consider moving their executive offices, their major pipe lines and their refineries, every time a new boom occurs. Every year more major oil companies move headquarters to Tulsa and firmly establish them here. Tulsa has more such headquarters than all other centers in the Southwest combined.

Oil geologists state that the next great oil developments will occur in Nebraska and Kansas. They also predict great additional development in Oklahoma, a prediction borne out by present leasing activities. These developments will further fortify Tulsa's already impregnable position as the World's Oil Capital.

Even today, when the Texas Gulf Coast is enjoying a boom, 368 wells are drilling in Oklahoma, to 150 in the Texas Gulf Coast.

Tulsa is headquarters for oil equipment buying, purchases totalling $400,000,000 annually. Tulsa is the logical Southwestern site for the branch offices and warehouses of oil equipment manufacturers. For facts and figures write the Tulsa chamber of Commerce.

TULSA
Oil Capital of the World

Central Ohio Is Showing the Greater Activity in the Fields of the Central West Area

By GEORGE A. WHITNEY
Staff Correspondent, Central West Fields

FINDLAY, Ohio, June 19.—Improvement is shown in development work in some of the divisions of the Central West Field, with the Central Ohio Field showing the greater activity. Indiana also reports a few completions. The Lima Field is showing a few drilling wells, and Illinois is also lacking in new work under way. In the old Lima Field of northwestern Ohio there are a few wells drilling, some shut down, and others under way. Wyandot County leads in drilling operations in the Lima Field. In this county, Keiner and others are reported drilling around 1,300 feet in No. 1 on the Louisa Brandt farm, Section 34, Crane Township, and No. 2 on the same farm is reported at a depth of 350 feet. Kennedy & Temple are reported drilling at 1,100 feet on the Mary Huffman farm, in Section 28, same township. Clarence Donnell is drilling No. 1 on the Sarah E. Tschanen farm, Section 34, same township. Crane Township Oil & Gas Co. is drilling around 800 feet on the Frank Benner farm, Section 33, same township, and Ferdell and others have a rig on the Mary E. Sampson farm, Section 20, same township.

In Crawford Township, Wyandot County, O'Neal and others struck gas at 1,262 feet, but is drilling deeper in hopes of finding oil. Robert Kirk and others made a location on the B. C. Root farm, Section 29, Crane Township, same county. Newcomer and others are still shut down at 1,913 feet on the Albert Reber farm, Section 1, Pitt Township, same county.

McPheron and others are reported at 750 feet in No. 4 on the Frank Fox farm, Section 11, Hopewell Township, Seneca County.

In Allen County, C. A. and F. J. Peavy are drilling No. 7 on the C. A. Hoover farm, in Bath Township, and Kelly Oil & Gas Co. is drilling No. 1 on the Mary A. Mosier farm, Section 25, Shawnee Township, same county. Ohio Oil Co. is drilling No. 8 on the George W. Tabler farm, Section 9, Perry Township, same county.

CENTRAL OHIO

The Central Ohio Field is the first in the Central West to show a nice increase in completions, new drilling wells and new locations, covering a large number of counties. In Lorain County, Ohio Fuel Gas Co. found a dry hole in No. 1-5,720 on the R. E. Ives farm, Lot 94, Eaton Township, in the Clinton lime. This well had only a light gas showing of oil and has been plugged and abandoned. Dempsey and others made a wildcat location on the H. E. Piper farm, Lot 63, Pittsfield Township, same county. In Ashland County, Stewart and others set a stake for No. 7 on the David Horn farm, Section 4, Lake Township.

In Medina County, Hulse and others made a location for No. 8 on the Desnoyes Realty Co. property, on Lot 78, Medina Township. Spohn and others are drilling No. 4 on the Clyde Bason farm, on Lot 9, Litchfield Township, same county. Barnhart and others are still fishing on the Hillside Country Club, on Lot 4, Richfield Township, same county.

In Summitt County, East Ohio Gas Co.'s No. 2, on the Everette Bexler farm, Section 17, Greene Township, is a gas well at 4,155 feet. Same company is drilling No. 2 on the John Wenhart farm, Section 20, same township.

In Coshocton County, Preston Oil Co. has a rig in for No. 1-1,522 on the Cary D. Hayes farm, Section 17, Perry Township. Pure Oil Co. is drilling around 1,200 feet on the Ray Hayes farm, Section 1, Newcastle Township, same county. Wiser Oil Co. has a rig on the Patterson & Crawford farm, Section 17, same township. Palmer & Deisinger are drilling at 3,270 feet on the Sol Haun farm, Lot 8, Clark Township, same county.

In Licking County, Wehrle Gas Co. has a gas well on the Gail Baker farm, Section 1, Granville Township, at a depth of 2,280 feet. McClay Brothers have a rig in for No. 2 on the Fern Smith farm, Section 7, Fallsburg Township. Settles Oil Co. made a location for No. 5 on the John A. Hughes farm, Section 2 and 3, Mary Ann Township, same county. Floyd Golden & Co. made a location for No. 7 on the George W. Smith heirs' farm, in Sections 17 and 18, Perry Township.

In Muskingum County, Brush Creek Township, Fritz Oil & Gas Co.'s No. 1 Elza Fountain farm, Section 33, is a gas well in the Berea sand.

Tuscarawas County

In Tuscarawas County, Hopewell Oil & Gas Co.'s test on the G. H. Hursey farm, Lot 22, Washington Township, produced 3 bbls. at 3,412 feet.

In Trumbull County, Johnson and others are drilling on the William H. Kane farm, Lot 59, Newton Township.

In Portage County, McClay Brothers are drilling on the Louis V. Miller farm, Section 19, Freedom Township, and Johnson and others have a rig on the Gail King farm, Lot 39, Charlestown Township.

In Stark County, Jackson Township, East Ohio Gas Co.'s test on the Hoover Co.'s land, Section 12, was a dry hole at 4,385-4,410 feet. In the same township, it is drilling No. 2-5,723 on the Elizabeth Harmount farm, Section 22, also No. 1-5,724 on the Howard Hoverland farm, Section 10, same township. In Marlboro Township, same county, Bredel Producing Co. is drilling No. 2 on the Dave and Nora Frederick farm, Section 10. In Plain Township, Kemrow Co.'s No. 1, on the Orchard Acres farm, Section 19, is a gas well at 4,558 feet. East Ohio Gas Co. is drilling No. 2 on the Charles and Stella Strauser farm, Section 18. Cunningham Natural Gas Co. has a rig in for No. 2 on the John Marquardt farm, Section 8, and Hoover Development Co. is drilling No. 1 on the Hoover company's land, Section 18, same township.

In Belmont County, Schaffer & Workman's test, on the J. C. Dunlap farm, Section 31, Flushing Township, was dry at 1,600 feet, after running into water. O. K. Oil & Gas Co. is drilling No. 1 on the Fred Jones farm, Section 35, Union Township.

In Guernsey County, McLaughlin and others' No. 2, on the W. H. Dike farm, Section 9, Adams Township, is a light gas well at 1,100 feet. Charles Smith and

(Continued on Next Page)

Activity Is Increasing in West Virginia Field; Twelve New Operations in Cabell County

By STAFF CORRESPONDENT

PITTSBURGH, Pa., June 19.—Fewer wells than usual were completed in the three districts of the lower eastern fields. Actual late completions were confined to three gas wells, all of which were fair wells and located in West Virginia. Southeast Ohio had nothing to report, and in Southwest Pennsylvania three wells which had been standing for some time were listed as dry holes and abandoned.

In addition to a continued fair demand for Pennsylvania Grade crude, gas companies are now reporting that there has been a steadily strengthening demand for gas from industrial users. This is to be expected with the resumption of many mills in the Pittsburgh district.

The greater part of the activity in the eastern fields is at present localized in West Virginia, where several additional tests have started or been located. Twelve operations are listed in Cabell County, with additional activity showing in Calhoun and Lincoln Counties. Another location has been made in Lost Run Pool, Clay district, Ritchie County.

WEST VIRGINIA

No additional production was completed in West Virginia. Completions consisted of the three gas wells, of which two were fair tests in Cabell County. In Guyandotte district, Gwinn Brothers & Co. completed a test on their own property in the Brown shale at a depth of 2,891 feet. It is gauged for about 850,000 feet a day initial. In the same district, Eureka Gas Co. completed a test on the Huntington Sand & Gravel Co. lease, also in the Brown shale and a depth of 2,803 feet. It is showing for 631,000 feet a day.

In Roane County George E. Smith and others completed a test on the C. A. Kendall farm in Spencer district, on the waters of Buffington Run of Laurel Creek of Henry's Fork. It is an Injun sand gas well at a depth of 2,271 feet and is good for about 700,000 feet a day.

Drilling in West Virginia

In Ritchie County, Frank Finley and others have made a location for a second test on the Bohem and Neeley lease in Clay district. Their No. 1 on this farm continues as a fair producer from the Injun sand. In Murphy district Lewis Gas Co. has made a location on the Conley heirs farm. In Grant district H. N. Rinehart is down to 1,950 feet in drilling his No. 1 on the J. B. Markey farm deeper.

In Lincoln County, Pridemore and Adkins have part of the material on the ground for a test on the Henry Chandler heirs farm in Jefferson district. In the same district Turtle Lick Gas Co. has material on the ground for a second test on the George Thompson farm. In Sheridan district Kanawha Gas & Utilities Co. is down 1,980 feet in a second test on the Nona Johnson farm.

In Cabell County, Guyandotte district, another test is listed. Graham Gas Co. is setting a machine on the S. P. Hager farm. In the same district other operations follow. Petry and Borders are spudding on the Shelby Johnson farm. Copeland Gas Co. has reached 960 feet on the E. N. Waugh farm., Huffman Oil & Gas Co. is down 1,400 feet on the William Prindle lease. Adkins and Marsh are drilling at 1,315 feet on the C. M. Watts lot. Swanson and Martin are down 1,300 feet on the J. T. Tubert farm. C. C. Wolfe and others are waiting on a shot in their No. 5 on the Ben Lomond Land Co. tract at 3,080 feet. The same operator is drilling at 2,080 feet on the T. H. Tanner farm.

In other parts of Cabell County Manufacturers Light & Heat Co. is drilling on the W. H. Holton farm in McComas district at 1,370 feet. In Union district, G. W. Shipes and others have reached 700 feet on the Callie Massey farm.

In Wayne County the West Virginia Gas Corp. is spudding on the Henry Adkins farm in Union district. In the same district this company is drilling on the C. M. Watts farm deeper from the Berea sand at 3,410 feet.

In Putnam County, United Fuel Gas Co. is making fair headway in No. 4,378 on the J. L. Ashworth farm in Curry district. It has reached 1,800 feet. Teays Valley Oil & Gas Co. is still shut down for casing on the C. H. Cottle farm in Scott district and at 1,700 feet.

In Boone County, Pond Fork Oil & Gas Co. is down 2,625 feet in No. 14 on the Cole and Crane lease in Washington district. In Crook district Pure Oil Co. has reached 2,854 feet on the Pocatello C. & C. Co. tract. In Union district, B. F. Best and others are down 2,845 feet on the H. A. Casdorph and others' lease. In Sherman district Pure Oil Co. has two wells drilling. Its No. 61 on the Federal Coal Co. tract is 2,262 feet deep and its test on the Lafollette, Robson and Pritchard tract C is 2,441 feet deep.

In Roane County, Charles Despard and others are spudding on the Charles Starcher farm in Smithfield district. In Curtis district Reedy Oil & Gas Co. has resumed drilling in a second test on the G. A. Knopp farm. Big Four Drilling Co. has made a location on the W. S. Fouty lease in Curtis district.

In Calhoun County, Grant Fowler and others are spudding on the O. W. Grove farm in Washington district. In Sheridan district, Ira Haught and others have made a location for No. 3 on the Alva Elder farm. In this district, W. J. and O. L. Yoke will soon be in the sand in their second test on the A. T. Yoke farm. In Sherman district, Creed Barker and others are spudding on the J. Lawson Kelley

farm, and have material on the I. B. Fowler farm. Poling and Mollahan are down 1,200 feet on the F. M. White farm. In Center district, Starcher and Richards have a rig standing on the Chenowith and Edman farm, and Everett Starcher and others have completed their rig on the C. C. Starcher farm. In Lee district, the deep test of F. F. McIntosh is down 4,740 feet.

In Marion County, Victor Oil & Gas Co. has a rig standing on the Charles H. Freeland farm in Mannington district. In Wood County, C. T. Smith reached 1,140 feet on the George Webber farm in Clay district and shut down. In Gilmer County A. E. Ellis and others are down 1,000 feet on the Webster and Ware lease in DeKalb district.

SOUTHEAST OHIO

No completions were reported from Southeast Ohio and no increase in drilling noted. In Coshocton County Kundtz-Hulse are drilling on the R. L. McKee farm in Perry Township, Section 17. In Clark Township Mehowa Oil & Gas Co. is drilling on the Sol Haun farm, Section 8, which should soon be completed.

In Tuscarawas County, Hopewell Fuel Gas Co. is drilling on the Edward Hursey farm, Lot 22, Washington Township. In Belmont County no report has been had of the test the Steuben Oil Co. is making on the Carroll and Eberts lease in Richland County which is due in the sand.

SOUTHWEST PENNSYLVANIA

Three wells which had been standing for tests in scattered sections of Southwest Pennsylvania were finally abandoned as dry holes. In McCandless Township, Allegheny County, Goettman & Co. drilled their test on the S. Grubbs farm through the 30-foot sand which proved a nonpayer. In Forward Township, Butler County, W. I. Goettman & Co. drilled a test on the George Dombart farm to 1,400 feet and abandoned it as a duster. In Hanover Township, Washington County, Reed & Co. abandoned their test on the W. C. Arnold farm, the Dunkard and 30-foot sands proving dry.

In Amwell Township, Washington County, Jess Moore & Co. are building a rig on the John Parker farm of 10 acres, about 2,000 feet southwest of the Morton producer. Hallam and Lewis are down 2,680 feet on the John Roach farm having cased off the water which had flooded the hole and resumed drilling. The Gas sand is about 70 feet deeper. Carnegie Natural Gas Co. is down 2,330 feet in its test on the Mrs. Meunzer farm. Raymond Orrill & Co. have reached 1,940 feet in No. 3 on the Martha Hazlett farm.

Wildcats

In Virginia the only test still drilling is the Benedum & Trees test on the I. Kaufman farm in Wise County. After a little trouble the hole is being reamed and the depth is about 3,650 feet. Their test on the Pocahontas Coal Co. tract in McDowell County, West Virginia, is still shut down with a fishing job.

Central West Fields

(Continued from Preceding Page)

others' test on the Ruby-Shriver farm, Section 17, Jackson Township, same county, was dry at 1,231 feet.

Canton Drop Forge Co. is drilling around 3,300 feet on its own property, Section 9, Canton Township, Stark County.

Stoltz and others are drilling around 3,700 feet on the Joe E. Beechy farm, Section 6, Berlin Township, Holmes County.

INDIANA

Six completions were reported from the Indiana Field, one being a dry hole and five gas wells, all being in Pike County. The dry hole was drilled by Tressler, Barnett and others, their No. 1, in the northeast corner of the Earl E. Reed farm, NW Section 1, Washington Township, at a total depth of 1,223 feet. Harry N. Bell and others' test in the northwest corner of the George Leight farm, Section 18, same township, topped the gas sand at 1,051 feet and finished at 1,062 feet, with 750,000 feet of gas. Same parties drilled No. 4, 320 feet from the north line and 990 feet from the west line of the R. N. Craig farm, in Section 20, same township, found the gas pay of 1,500,000 feet, at 1,059-74 feet. Claude E. Noble and others' No. 2, 330 feet from the north line and 345 feet from the west line of the Helen Smith farm, SW Section 17, same township, produced 3,250,000 feet of gas at 1,017-24 feet. Vern Burden's No. 3, in the northwest corner of the W. H. Smith farm, NE Section 17, same township, finished with 250,000 feet of gas at 1,036-53 feet. Charles C. Taliaferro, Jr., is drilling No. 2 on the Inman farm, NE Section 26, Washington Township, Pike County.

In Madison Township, Pike County, Ohio Oil Co. abandoned old Nos. 1 and 4 on the John A. Sutton farm, SE Section 30.

ILLINOIS

Only one completion was reported from the Illinois Field, Big Four Oil & Gas Co.'s No. 2, 200 feet from the south and west lines of the F. J. Piper farm, SE Section 20, Bridgeport Township, Lawrence County, with an initial production of 10 bbls. from the Tracy and McClosky sands at a total depth of 2,049 feet. Other wells drilling in Clark, Coles, Crawford, Boone, Jasper, Clinton and Bond Counties are shut down.

KENTUCKY

Completions are scarce in any part of the Kentucky fields, as only one well was reported, a dry hole drilled by Strouse and others in the southwest corner of the E. Ambrose farm, in the Cane Run Pool, of Daviess County. Most uncompleted wells in the Owensboro Field are shut down awaiting a better price.

Completions Show a Temporary Decline During Week in Central Michigan

By GEORGE A. WHITNEY

MOUNT PLEASANT, Mich., June 19. Pure Oil Co.'s No. 8, 990 feet from the north and east lines of the Charles D. Mullett and others' farm, W half NE NE Section 15, Greendale Township, Midland County, after being treated with acid, showed a production of 85 bbls. W. A. Robinson's test, 330 feet from the south and west lines of the H. J. Oldham farm, SW SW SE Section 6, same township, swabbed 50 bbls. and will be given an acid treatment. Pure Oil Co. is reported to have abandoned its test 990 feet from the north and west lines of the Mills estate farm, SE NW SE Section 36, Mills Township, Ogemaw County. This well was said to have shown 250,000 feet of gas from a depth of 1,170 feet, but nothing was found below.

Theodore Oil Co.'s No. 1, 990 feet from the north line and 330 feet from the east line of the Adrian Steed farm, NE NE SE Section 8, Greendale Township, Midland County, which produced an initial of 180 bbls., was treated with acid and produced 368 bbls. in 24 hours.

Meridian Oil & Gas Co.'s No. 2 on the E. L. Russell farm, NW SE NW Section 22, Vernon Township, Isabella County, that produced initially more than 800 bbls., is reported showing considerable water, materially reducing its oil production. Mellon-Pollock Oil Co. at last report was fishing at 314 feet in a test 660 feet from the south and east lines of the Frank McGuire farm, C SE SE Section 36, same township. This test is drilling for gas. Same company has a location on the Stough farm, NW SE SW Section 23, same township, and the Mammoth Petroleum Co. has a location on the Verrethe farm, NW SE SE Section 23, same township.

Talbot Oil Co.'s No. 4-C, in the southeast corner of the State of Michigan land, SE SE SE Section 10, Greendale Township, Midland County, reports a fishing job in the Dundee formation.

Pure Oil Co.'s No. 1 State-Porter farm, NW NW SE Section 15, Porter Township, Midland County, completed in April with an initial of 5,000 bbls., stopped flowing suddenly, the previous day it had flowed 1,200 bbls. Tools were run into the hole and the well was slightly deepened. The following day it came back to better than 1,200 bbls. and was producing steadily at the last report. The abrupt shutting off was attributed to its plugging up in the producing strata.

Porter Pool

Unless acid increases production on two Porter Township, Midland County wells, the first failures or extremely light wells will be chalked against the new central Michigan pool. Pure Oil Co.'s No. 2, 2,310 feet from the north and east lines of the Mina C. Naramore farm, SW Section 15, Porter Township, and a direct north offset to the big State-Porter well, in Section 15, failed to show encouragingly for a producer in the Dundee lime. Sun Oil Co.'s No. 1, in the southeast corner of the J. L. Miller estate, SE SE NW Section 16, Porter Township, a key well between the No. 2 Otway discovery well and Gordon Oil Co.'s No. 1 Muscott, also showed light. Sun company's well is being treated with acid as well as No. 2 on the Naramore farm. Both wells show about 500 feet of oil in the holes. Failure of No. 2 on the Naramore farm to produce commercially when drilled in brought the first serious setback to Porter Township development since the field was opened in February. Sixteen commercial wells had been drilled in the field against no failures. Geologists attribute the failure of No. 2 Naramore to produce to a "tight spot" in the lime formation. The State-Porter is producing from but a few feet in the Dundee pay and from an extremely porous strata. Apparently the porous streak ends abruptly to the north. Sun Oil Co.'s No. 1 Miller shows better than No. 2 Naramore, and operators anticipated it would make a commercial well.

Operators, despite the present poor showings of the two tests, are inclined to regard the results as "freaks" and not as an indication against great future development in Porter Township and the adjacent area. In other pools of Central Michigan as well as other oil fields of the country it is not uncommon for dry holes to result when producing wells are offset. A similar occurrence happened when Pure Oil Co. offset one of its own wells in the Yost Field. The Lime formation is spotty with both hard and soft streaks. Where it lacks porosity it cannot produce unless artificial stimulation brings in production. It is highly likely offsets beyond both No. 2 Naramore and No. 1 Miller will produce. How far the hard streak in the formation runs can be determined only by additional exploration. Completion of No. 1 on the Naramore west offset to the No. 1 State-Porter, will throw important light on the productivity of Section 15.

Field Pickups

McClanahan Oil Co.'s No. 1, southwest corner of the S. M. Densmore farm, SW SW NW Section 4, Porter Township, Midland County, and the farthest test to the north since the discovery well of the township, is down close to 1,000 feet.

In Porter Township, William J. Wilson's No. 1, in the northeast corner of the Glen R. and Mildred Hathaway farm, NE NW Section 18, Porter Township, Midland County, is looked upon as an important test for a west extension.

Thompson & Fortney's test, in the southwest corner of the Gilbert A. Currie farm, SW SW SW Section 16, Mount Haley Township, Midland County, is around 800 feet in depth and there are hopes of an eastern extension to production.

Greendale-Lee Development Co. is reported down around 700 feet on the Willard Hitsman farm, NW NW SW Section 13, Lee Township, Midland County. W. Hunter Athey made a location in the NE NE NE Section 7, same township, on the Talker farm. The Willard-Hitsman test, being made by Greendale-Lee Development Co., is a far east test, being more than 5 miles east of the east limits of present production in the Greendale Field, and a commercial well on this location would open a large area.

Drilling Permits

Permits were issued to George C. Hanners for No. 1, 330 feet from the south and east lines of the G. R. Hathaway farm, SE SE NE Section 17, Porter Township, Midland County; to Charles C. Flarida and others for No. 1, 1,913 feet from the north line and 602 feet from the east line of the Pringle heirs' farm, NE S half NW Section 14, Greendale Township, Midland County; to Pure Oil Co. for No. 3, 330 feet from the south and west lines of the Mina Naramore farm, SW SW Section 15, Greendale Township, Midland County; for No. 4, 330 feet from the south line and 2,310 feet from the west line of the Mina Naramore farm, SE SW Section 15, Porter Township, Midland County; to Strange Oil & Gas Co. for No. 2, 330 feet from the south and west lines of the Sam Walley farm, SW SW SE Section 16, Porter Township; for No. 3, 330 feet from the south line and 990 feet from the west line of the Sam Walley farm, S WSW SE Section 16, Porter Township, Midland County; to Edward Stewart for No. 3, 990 feet from the south line and 330 feet from the east line of the J. B. Richmond farm, NE SE NW Section 22, Porter Township; to Edward Stewart and others for No. 6, 990 feet from the north line and 330 feet from the west line of the J. Opperman and others' farm, SW NW SE Section 12, Greendale Township, Midland County; to Thompason Brothers for No. 1, 990 feet from the south line and 330 feet from the east line of the Claud Harnick farm, NE SE NE Section 14, Greendale Township, Midland County; to the Muskegon Oil Corp. for No. 1, 350 feet from the south line and 330 feet from the east line of the J. Wambagh farm, SE SE SE Section 9, Leavitte Township, Oceana County; to O. H. O'Neal for No. 1, 990 feet from the north line and 330 feet from the west line of the Roy Caywood farm, SW NW NW Section 6, Porter Township, Midland County; to Ira Scheifley for a test 330 feet from the north line and 990 feet from the west line of the Abram Van Buskirk farm, NE NW SE Section 4, Greenwood Township, Clare County.

DECLARES DIVIDEND

Evidencing confidence in present-day and future conditions, the Wyatt Metal & Boiler Works voted a 3 per cent dividend on its $1,000,000 capital stock at a meeting of the board of directors held in Dallas, Tex., on June 15. W. J. Wyatt, president of the company, said the dividend was from current earnings and will be paid in two installments, on July 1 and October 1, representing dividends for six months. The Wyatt company builds refinery equipment and in recent years has been building all-welded steel tanks for the oil industry. It maintains plants in both Dallas and Houston, Tex.

NOT REPRESENTING JOURNAL

H. H. Jenkins, formerly a subscription solicitor for The Oil and Gas Journal, but no longer connected with this publication, is soliciting Journal subscriptions without authority. Jenkins is about 60 years of age, quite lame, and walks with a cane. The management of the Journal is making an effort to determine where this man is now operating.

Rangely Dome Discovery of Major Importance; First Oil Producer in the Weber Formation

By TOLBERT R. INGRAM
Staff Correspondent, Rocky Mountain Area

DENVER, Colo., June 19.—The California Co.'s No. 1 California-Raven, on the Rangely Dome in western Colorado, is flowing 20 bbls. per hour of 32 gravity oil from the Pennsylvanian formation. This is the first producer in Colorado from that horizon and will attract attention to numerous structures in northwestern Colorado and eastern Utah which have never been drilled to that horizon. One well was abandoned in Fremont County and another in La Plata County.

Continental Oil Co. and California Co. appear to have a good producer in the Jal Pool in New Mexico. One new operation in Torrance County and a location in Eddy County were reported.

A test in the Pennsylvanian formation in Albany County, Wyoming, is showing some oil and gas in the top of the objective. One well was abandoned in Uinta County. There were no completions.

In Montana, three new locations were made in Cut Bank. Five wells in May averaged 39 bbls. each per day. One new operation was reported in Musselshell County.

One wildcat in South Dakota is resuming. One small well was completed and another was abandoned in Utah. Idaho reports one active operation.

NEW MEXICO

Lea County

Pipe line runs from the Hobbs Pool aggregated 890,532 bbls. in May, bringing the total since proration went into effect to 32,907,803 bbls. There were no changes in nominations or allowable outlet for the first half of June.

Continental Oil Co. and California Co.'s No. 1-A Wells, SW NE NW Section 12-25-36, Jal area, in a short company test flowed at the rate of 1,000 bbls. per day and looks as if it will be a good well. It was drilled to 3,408 feet in lime. The 7-inch was set at 3,385 feet and is waiting for cement to harden. The show of oil before setting pipe was made through a three-quarter inch choke. It is an offset to a producer. Several large flows of gas were encountered in upper horizons.

In the Hobbs Pool, Amerada Petroleum Corp.'s No. 3 Hardin, NW cor. SW Section 18-18-38, at the extreme north end, drilled through the casing at 4,014 feet and is making hole at 4,041 feet in lime. It will test at 4,060 feet. Below that depth in the old hole it tested water.

In the South Eunice area, the Carter and Continental Oil companies' No. 1 State, C NE NE Section 28-22-35, is drilling water well at 910 feet, but has not yet encountered any water. Cellar has been completed.

In the Jal area, E. B. Guess' No. 1 Conditt, C SW SW Section 12-25-36, which has been waiting for rotary at 530 feet, is building derrick.

In the Lea area, Texas Co.'s No. 3-A Lynch, C NW NE Section 34-20-34, topped the salt at 1,740 feet and is drilling at 2,155 feet in that formation. The elevation is 3,725 feet. Cranfill & Reynolds' No. 4 State, C Lot 10, Section 2-21-33, spudded June 1 and is fishing at 75 feet in sand.

Eddy County

R. D. Compton's No. 2, NE Section 8-18-27, southeastern Artesia area, is a location. Flynn, Welch & Yates' No. 64 State, SE NE NW Section 10-19-28, is drilling at 2,029 feet in lime. It had a show of gas at 1,995 feet and a show of oil at 2,015 feet.

Ralph Spearow and others' No. 1 McClellan, SW NW NE Section 22-22-23, Indian Creek, is drilling at 2,630 feet in black lime. The formation has softened considerably and much faster progress is being made.

C. H. Lockhart and others' No. 2 Root, C SW SW Section 7-17-30, Maljamar area, landed the 10-inch at 387 feet and is drilling at 420 feet in the red beds. Western Drilling Co.'s No. 2-A Green, C SW NE Section 29-17-29, Jackson area, is drilling at 1,520 feet in anhydrite.

Torrance County

An operation not heretofore reported is J. E. Williams' No. 1, Section 22-4n-12, reported drilling below 400 feet. This is in a new district in the southeastern part of the county.

San Juan County

R. R. Burke's No. 2 Government, C NW SW Section 18-21-13, Stoney Butte, is bottomed at 501 feet and underreaming 8¼-inch at 435 feet. Fred Barrett's No. 1 Hart, SW NW SW Section 11-29-11, Fulcher Basin, is idle at 860 feet. It had 1,000,000 feet of gas at 700 feet. Kutz Canon Oil & Gas Co.'s No. 1 Day, SW cor. Section 20-28-10, Kutz Canon district, is fishing for bailer at 4,100 feet. Rio Grande Development Co.'s No. 2 Lanier, SE cor. NW Section 9-29-11, Bloomfield district, which has been shut down at 1,771 feet on account of litigation, has resumed. Gobernador Oil Co.'s No. 1 Likens, SW NE SW Section 12-29-9w, Blanco district, is fishing for tools at 2,258 feet. Cross & Pool's No. 1, SE NW Section 17-30-11w, Aztec district, is shut down at 1,150 feet and McCoy & Phillips' No. 1, SW cor. Section 27-29-12, Bloomfield, is drilling at 410 feet.

McKinley County

Frank Weber and others' No. 1, SW NE Section 29-20n-9w, Bonita district, is spudding at 200 feet. It starts in the Mesa Verde.

Guadalupe County

Anton Chico Development Co., Ltd.'s No. 1 Anton Chico grant, is bottomed at 2,320 feet and underreaming 8¼-inch at 2,189 feet.

Catron County

R. C. Bailey's No. 1, Section 34-2n-16w, Quemado district, is spudding at 245 feet. It is not far from A. R. Fenner's No. 1 Bailey, NE NW SW Section 35-2n-16, which was drilled to 670 feet in 1931.

Bernalillo County

Norins Realty Co., Inc.'s No. 1 Pajarito grant, NW cor. NE Section 22-9n-1e, southwest of Albuquerque, is drilling at 5,195 feet.

COLORADO

Rio Blanco County

A discovery of major importance has been made in California Co.'s No. 1 California-Raven, C NW SE Section 30-2n-102, Rangely Dome, in the northwestern corner of Rio Blanco County, west of the main mountain range and just east of the Utah line. For more than five days it has been flowing a steady stream of oil at the rate of 20 bbls. per hour from the Weber formation of Pennsylvanian age, following a shot. This is the first producing well in that formation in Colorado and opens possibilities not only on several structures in Rio Blanco County, but on the Iles, Moffat, Thornburg and other domes in Moffat County which are producing oil or gas from younger formations but have never been tested below the Sundance of the Jurassic period. Mountain Fuel Supply Co. is now drilling a 7,000-foot test to the Pennsylvanian on the Hiawatha Dome which produces gas from the Wasatch formation of Tertiary age. The area which will be brought to the attention of operators by the Rangely discovery extends over into eastern Utah.

No. 1 California-Raven was started early in 1931 for the purpose of determining the possibilities in the deeper beds. The Rangely Field has been producing high gravity oil in small quantities from shallow wells at a depth of 600 feet for a number of years. Midwest, Texas and Associated Oil companies have drilled tests on the structure, one of the largest in Colorado, and encountered large quantities of gas in the Dakota horizon. One or two of these operations tested the Sundance. The Weber formation, which correlates to some extent with the Tensleep, of Wyoming, remained untested until the California Co. undertook this operation. It began coring at 5,781 feet and penetrated saturated limes broken with streaks of shale. The hole was unloaded at 6,228 feet for a test, but the results were not disclosed, although it was generally credited with showing for a 250-bbl. well. Drilling and coring then was resumed and the hole carried to 7,173 feet It was plugged back to 6,315 feet and was given a swabbing test for 30 days. It started out making 100 bbls. of fluid per day of which 80 per cent was oil. The water gradually disappeared and the oil increased. The hole was shot with 600 quarts in series of shots between 5,657 and 6,200 feet and the oil rose almost to the top, but the well did not flow. A string of 2½-inch tubing was run to 2,700 feet and last Friday the well began flowing, making about 18 bbls. per hour. It increased to 20 bbls. per hour and has since been making a steady stream of oil. With the tubing so far off bottom, there is considerable pressure on the sand. It is probable that after a test it will be cleaned with rotary tools and given another shot. Approximately 600 feet of saturated formation was shot the first time. The oil is about 32 gravity and of paraffin base as compared with black oil in the Pennsylvanian in northwestern Wyoming.

Moffat County

William A. Myers and others' No. 1 State, NW SW SW Section 16-4n-101, Skull Creek, which has been shut down at 3,250 feet, 2,000 feet below the Tensleep, will resume July 1 and go 500 feet deeper to pick up a thick sand which shows saturation at the outcrop. This well has gone through the horizon producing in the Rangely well and encountered good shows of oil in a broken lime similar to that found in the new discovery. The objective sand is 300 feet thick at the outcrop.

Mountain Fuel Supply Co.'s No. 2 Florence Wilson, C NE NE Section 22-12n-100, Hiawatha, after coring the gas sand at 2,300 feet, set 13⅜-inch casing at 2,210 feet and is drilling at 2,535 feet. This well ranks with the Rangely test in importance as it is headed for the Pennsylvanian, expected at or below 7,000 feet. The Dakota and Sundance have never been tested at Hiawatha as the gas is being produced in a formation of Tertiary age. This company's No. 1 Wilson, on the same quarter as the deep test, has been showing small quantities of oil for some time. Same company's No. 1 Hatch, C NW SW Section 9-11n-101, Sugarloaf Dome, is spudding and expects the Frontier at around 2,500 feet. Rocky Mountain Gas Co.'s No. 1 Eberle, SE SW SE Section 9-6n-91, Craig Dome, is building rig for its second well on the structure to the gas horizon at 2,800 feet. In No. 1 gas, which is being used to supply Craig, was found in lower Mesa Verde and the Frontier, Dakota, Sundance and Pennsylvanian offer possibilities at greater depth. Rotary tools will be used and it will start in a 15½-inch hole.

Park County

South Park Oil Co.'s No. 1 Milligan, NE cor. SE Section 13-8s-76, Jefferson district, is cleaning out at 3,042 feet after mudding 4¾-inch. South Park Oil & Gas Co.'s No. 1 Esche, SE cor. NW Section 5-9s-76, Como district, is bottomed at 2,465 feet where it has been delayed with parted pipe and tools in the hole. All the casing except five joints has been recovered. A hold has been secured on the remainder and it is coming out with the tools in it. This test had a show of oil in the Muddy and is making some gas through water from the Dakota. It is estimated to be about 60 feet off the Lakota.

Boulder County

Consolidated Smelting & Metals Co.'s No. 1 Blubaugh, SE cor. Section 20-3n-70, Lyons district, is drilling below 810 feet in hard lime.

Larimer County

C. Leonard Smith's No. 2 Union Pacific, SW cor. Section 31-12n-69, Sand Creek, is preparing to run 6¼-inch to set at 615 feet. It is a Pennsylvanian test and had a show of oil at 560 feet and a show of gas at 610 feet.

Jackson County

Continental Oil Co.'s No. 1 Hoye, NE SW NE Section 34-9n-78, South McCallum, is setting up boilers to resume. Five years ago it encountered carbon dioxide gas at 4,875 feet and efforts to clean out bridges and complete it were unavailing. Tools run into the hole would freeze, then blow out and almost every conceivable difficulty was encountered. The hole often bridged and when attempts were made to clean out it would blow everything away. Last fall the U. S. Geological Survey inspected the well, which was reported leaking gas outside of the casing, but recommended that on account of the hazard involved, no attempt be made during the winter to complete it or plug it. Representatives of the survey have a plan by which they believe the well can be controlled and will work in co-operation with the company. The well is similar in character to the famous "ice cream" well on the north dome, which made frozen slush composed of oil with the gas.

Adams County

Hills Dome Lease Development's No. 1 Hills, SE cor. Section 27-3s-64, Watkins district, which has been standing at 4,119 feet, is preparing to resume July 1.

Las Animas County

Continental Oil Co.'s No. 1 Maxwell grant, NE NW NE Section 29-34-68, Tercio Dome, a test to the Dakota, spudded June 9.

Fremont County

Cherry Creek Placer Co.'s No. 1 Lucas,

SW cor. NE Secton 32-18-69, Florence district, set the 5⅞-inch at 1,360 feet, drilled to 1,855 feet and shut down. Dr. T. A. Davis' No. 7 Mojada, NE SW SE Section 21-20-69, was plugged and abandoned at 2,625 feet.

La Plata County

J. W. Irwin & Co.'s No. 1 Doescher, SW cor. NW Section 29-33n-13w, Dry Mesa district, is preparing to plug and abandon at 3,357 feet. It had a show of oil and water in the Dakota. Phipps and others' No. 1, SW NW Section 9-33-13, is drilling at 870 feet.

Montezuma County

National Park Service's No. 1, Section 9-34-15, Mesa Verde National Park, drilled for water, was completed at 4,192 feet. Water was encountered in the Navajo sand at 4,065-4,192 feet and rose 2,700 feet in 10 minutes. It swabbed 750 bbls. per day without lowering the water level.

Prowers County

Shastatex Oil & Gas Co.'s No. 1 Lotus Oil, NW NE NE Section 15-23-46, Lamar district, is drilling in sand at 825 feet with a hole full of water.

WYOMING

Albany County

S. Marvin James & Co.'s No. 1-A Hindry, C SW SW Section 10-13-76, Riverside district, is at a critical stage and is attracting attention. It is bottomed at 1,318 feet and waiting for fishing tools. It is in the top of the Casper (Pennsylvanian) formation and believed close to the objective Tensleep sand. In the past 10 feet it has been showing a little oil. It ran into a pocket of gas which pushed the tools up into the hole and when they dropped back, the drilling line snapped. The beds being tested are logged at 4,900 feet in the Rock River Field to the north and outcrop 5 miles to the south where they show a saturated sand 300 feet thick.

Sweetwater County

Mountain Fuel Supply Co.'s No. 2 Cappers, SW cor. NW Section 12-19-104, North Baxter Basin, is drilling at 2,710 feet with 10¾-inch cemented at 2,580 feet to shut off water from the Frontier. Same company's No. 2 Union Pacific, SE cor. NW Section 21-16-104, South Baxter Basin, is drilling at 1,405 feet.

Sublet County

Calmonica Petroleum Corp.'s No. 2 Elkhorn, SW SE Section 27-27-113, LaBarge district, cemented the 5⅞-inch at 2,025 feet and is ready to drill in. It is only a short distance from a well drilled by this company in 1930 which marked an extension of the LaBarge Pool with a production of 124 bbls. the first 24 hours.

Uinta County

Park City Oil & Gas Syndicate's No. 1 Christensen, NE cor. Section 6-15-113, Lyman district, is drilling at 3,090 feet with a hole full of water. General Petroleum Corp. of Utah's No. 1 Hayes-Union Pacific, SW NW SW Section 29-14-118, Spring Valley district, is drilling at 425 feet in shale, and Druscilla Connell and others' No. 5, SW NW NW Section 24-15-118, is bottomed at 710 feet in lime and underreaming the 6¼-inch for a water shutoff. A. R. Johnson's No. 1 Morrison, SW cor. NW Section 2-14-118, Aspen district, was plugged and abandoned at 1,218 feet in shale.

Lincoln County

H. C. Harris and others' No. 1, C NW SE Section 14-21-117, Fossil district, has resumed at 1,507 feet. It was reported abandoned without plugging four months ago.

Carbon County

Ohio Oil Co.'s No. 1 Haslett, SW Section 34-23-79, Allen Lake, is drilling at 890 feet.

Natrona County

Empire State Oil Co.'s No. 17, NE Section 12-33-83, Poison Spider, is testing water shutoff after cementing 5⅞-inch at 1,333 feet. Mutual Oil Syndicate's No. 2 Boyer, NE SW NE Section 23-35-79, Midway Dome, is drilling at 1,414 feet with the Shannon as the objective. If this test shows that the formations continue to rise towards the southwest, the hole will be carried on down to the lower sands.

Washakie County

D. L. McDonald and others' No. 1 Wheeler, SW cor. SE Section 30-48-90, Hidden Dome, will begin drilling by June 30 as result of signing of contract on June 7 with E. E. Flanders, Abe Friedman and Gail Lewis, of Rapid City, South Dakota.

Big Horn County

Slagle Oil Co.'s No. 2, SW NE Section 25-51-93, Torchlight district, is drilling at 900 feet with the Dakota as the objective. Its No. 1 hole was lost last year and rig was skidded.

Weston County

Rose & Herbison's No. 1, NW NE NE Section 13-46-64, Osage Field, is drilling below 400 feet, and Paymac Oil Corp.'s No. 1 Toyne, SE NW NE Section 3-46-64, is bottomed at 1,650 feet and waiting for casing. Duluth-Wyoming Oil Co.'s No. 3, SE cor. SW Section 12-46-64, is waiting on cement after setting the 8¼-inch. Wyoming Oil & Gas Co.'s No. 18, SE NW SE Section 19-46-63, has rig on location.

MONTANA

Glacier County

The tribal council of the Blackfeet Indians rejected a second bid of the Texas Co. of a bonus of $4.25 per acre and annual rentals of $1 per acre per year with an agreement to drill two wells for a block of Indian leases at Cut Bank and submitted a counter proposition which has been referred to executives in New York. The counter proposal called for a bonus of $8 per acre and one well to each 40 acres in five years. First bid several weeks ago of $2.50 bonus per acre was rejected following the auction at which the Texas Co. was the only bidder. The tract consists of 2,127 acres to the west and northwest of production.

A check on production in May of five wells in the Cut Bank Field showed an average of 39 bbls. per day each, exclusive of Tarrant's No. 1 Miller, which is making 200 bbls. per day choked down. Various pipe line projects considered for the field are expected to await further development. The Miller well, the only flowing well in the field, has considerably enhanced the future possibilities of the area. The average cost of drilling wells is $18,000 complete, or $13,000 to $14,000 where casing is furnished.

Three new locations in Cut Bank were released this week. These are Johnson's No. 1 Ewing, C Lot 1, Section 3-34-6w, building rig; Santa Rita Oil & Gas Co.'s No. 3 Yunck, NE SE SW Section 14-34-6w, location; and the Hannah-Porter Co.'s No. 2 Britton, NW cor. SE Section 14-34-6w.

Alberta-Pacific Consolidated Oil Co.'s No. 2 Matson, SE NE SW Section 14-34-6w, is bottomed at 2,880 feet and underreaming 6⅝-inch to that depth. It had a little water at 2,848 feet and sand at 2,848-60 feet. Same company's No. 2 Kiesel, SE cor. NW Section 11-34-6w, topped the Colorado at 470 feet and is drilling at 540 feet. Montana Headlight Oil Co.'s No. 1 Williams, NW cor. NE Section 11-34-6w, is drilling at 240 feet, and Dakota-Montana Oil Co.'s No. 1 Haglund, Sr., SW NW NE Section 14-34-6w, ran 8¼-inch to 2,615 feet and is drilling at 2,675 feet. W. M. Fulton and others' No. 1 Haggerty, NE cor. Section 16-34-6w, is drilling at 2,867 feet, and Hannah-Porter Co.'s No. 1 Britton, NW NE NE Section 23-34-6w, is waiting for 6¼-inch at 2,893 feet.

Santa Rita Oil & Gas Co.'s No. 1 Jacobson, C NW NW Section 23-37-5w, joint with P. T. Sweeney, is resuming at 2,499 feet. This well is far to the north of production and has been reported running high. Same company's No. 1 Olson, NE cor. Section 26-34-6w, is bottomed at 2,845 feet and cemented 7-inch at 2,834 feet and is waiting for orders to drill in. R. C. Tarrant's No. 2 Haglund, Jr., C NW SE Section 13-34-6w, is drilling at 1,335 feet, and his No. 1 Hope, C SW SW Section 18-34-5w, topped the Colorado at 405 feet, set the 10-inch at 485 feet and is drilling at 650 feet. Par Oil Co.'s No. 1 Haines, SE SE Section 2-34-6w, shot the Darling sand at 2,800-38 feet with 70 quarts and is cleaning out. Total depth is 2,845 feet.

Big Horn County

Enterprise Oil Co.'s No. 2 Lynde, SW cor. SE Section 21-6s-35, Lodge Grass Creek, an old well being deepened, is drilling at 3,450 feet.

Carbon County

Ohio Oil Co.'s No. 9 Souders, C NE SW Section 2-7s-21, Dry Creek, is ready to drill into the Lakota at 5,471 feet, at which depth it standardized. Jack Creek Oil Co.'s No. 1-A, NE SE Section 15-7s-23, Jack Creek, lost some hole through

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Pipe Line Runs From Turner Valley Field Show Marked Increase Over Previous Month

By VICTOR LAURISTON
Staff Correspondent, Canadian Fields

CHATHAM, Ontario, June 17.—Pipe line runs for the Turner Valley Field for May showed a marked increase over April production, deliveries to the refineries totaling 64,601 bbls. in May against 45,763 bbls. the previous month. Deliveries to Imperial Oil Refineries, Ltd., totaled 58,930 bbls. in May against 40,345 bbls. in April; the May deliveries including 54,066 bbls. of naphtha and 4,864 bbls. of light crude. Deliveries to the Bell Refining Co. increased from 3,797 bbls. in April to 4,199 bbls. in May, while deliveries to the Regal Oil & Refining Co. dropped from 1,621 bbls. in April to 1,472 bbls. in May.

The May production represents the highest total since the same month of 1932. The increase of 18,838 bbls. in deliveries is in part due to the operation of the new Imperial Oil, Ltd., gasoline plant. This plant commenced operations about May 1, though it was in course of adjustment from time to time throughout the month. The June output of the plant is expected to be substantially larger than in May. The May figures were also increased by the placing of Mar-Jon-Freehold's No. 1 well on steady production.

North Turner Valley

In the North Turner Valley, Model Oils' No. 2, LSD 16, Section 22-20-3w5, is reported drilling below 5,675 feet. The test has gone through more than 150 feet of brown limestone and logging somewhat higher than Model's No. 1. There has been some increase in gas production and the drill is thought to be close to the main porous horizon. Model's No. 1, a half mile to the south, got its first gas at 90 feet in the lime and finished at 105 feet in the lime, or 5,905 feet, with a very good production. This well, after more than three years on production, is still one of the best in the field. It is planned to drill the test as far into the lime as possible.

Mercury Tract

In the Mercury section of the South Turner Valley Field, operations have been resumed on Miracle Oils' No. 2, LSD 16, Section 5-19-2w5. This test, which has been standing at a reported depth of 5,598 feet, will be completed with rotary equipment. It is thought to be close to the lime. The Miracle company is closely associated with the interest controlling Mercury Oils, Ltd. The latter company is making extensive direct sales from its producers in Section 4-19-2w5, sales in one week recently approximating 13,000 bbls.

Further south, Section 28-18-2w5, is the center of the greatest activity in Turner Valley. Following completion of Mar-Jon-Freehold's No. 1 producer, in LSD 9, there has been a distinct revival of work. Becker Syndicate's No. 2 Anaconda, LSD 15, the farthest advanced, is reported at 2,455 feet and runing casing after getting a gas show in the Blairmore formation at 2,425 feet. The well is reported logging high.

Sunburst-Mid-Royal's No. 1, LSD 14, same section, is reported spudding in, just west of No. 2 Anaconda on acreage originally held by Ray R. Knight of Vancouver. The drilling outfit of Mid-Royal Oils, Ltd., in the central field is being utilized.

A Vancouver syndicate has taken over some acreage in Section 28 midway between No. 2 Anaconda and Mar-Jon-Freehold's producer and has let drilling contract for a test of the deep lime to Boller, Sherman & Boller.

On the adjacent Section 33-18-2w5, Sterling Royalties' No. 1 is expected to spud in this month in LSD 1, in the middle of a triangle formed by the Merland, Mar-Jon-Freehold and Sterling Pacific's No. 1 producers. Rotary outfit previously used by Sterling Pacific Oil Co. is being rigged up.

Far South Tests

In the extreme south end of the field, Hoffar-Lundy Syndicate's No. 1, LSD 13, Section 22-18-2w5, is reported making new hole below 2,000 feet after setting 16-inch casing at 1,550 feet. Union Drilling Co.'s No. 1, LSD 8, Section 21-18-2w5, is drilling below 330 feet in a hard gray sandstone after encountering a small show of crude at the Belly-River-Benton contact at 320 feet.

Sentinel May Resume

Toronto interests represented by Cordingly, Pike & Co. are endeavoring to resume work on Sentinel Oils' No. 1 in LSD 15, Section 8-20-2w5. This hole has been standing for about three years after drilling to a reported depth of 5,850 feet. Location is on a potential structure east of the Central Turner Valley Field. Drilling started in the Edmonton formation and was reported in a post-Benton formation, possibly the lower Belly River, at 5,850 feet. Gas shows were met at 2,800 feet, 3,580 feet and 3,980 feet, with oil shows reported at 4,255 and 4,870 feet. The general area is thought by some operators to represent the main reservoir from which the Turner Valley structure derives its lighter hydrocarbons, but

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Wildcat Operations in Louisiana-Arkansas

(Continued from Page 111)

HEMPSTEAD COUNTY

Kentucky O. & G. Co.'s No. 1 Leslie, NW cor. SW NW Sec. 21-9-26 ..... Derrick.

LAFAYETTE COUNTY

Geo. W. Harper's No. 1 Reed-Bodcaw, NW cor. Sec. 16-15-22 ..... Derrick.

LITTLE RIVER COUNTY

American Portland Cement Co.'s No. 1 fee, 150 ft. S and E, NW cor. SW NE Sec. 21-13-33 ..... S.D. 2,500 ft.

MILLER COUNTY

J. T. Humphrey's No. 1 Grace, C SW SW Sec. 9-15-27... Cmtd. 10-in. 204 ft.

Tarkington et al's No. 1 Gibson, 1,980 ft. N, 660 ft. E, SW cor. Sec. 30-18-27 ..... Rigging up.

Mississippi

JONES COUNTY

Snow-Bloch Pet. Co.'s No. 1 Watson, 600 ft. W, 210 ft. S, center, Sec. 24-7-13 ..... Began drlg. June 2.

LAMAR COUNTY

Lamar Oil Co.'s No. 1 Scott, NE NE Sec. 18-2n-14..... Rigged up.

WARREN COUNTY

Kistler & Stivers' No. 1 Blake est., 1,215 ft. NE Blakely Station, Sec. 15-17-5 ..... Rig up.

East Texas

CASS COUNTY

T. H. Pardoe, operator's No. 1 S. A. Orr, in the G. W. Morris Sur., 390 ft. east of the W line of the G. W. Morris Sur., also the east line of the David Frazier Sur. ..... S.D. fuel, 2,160 ft.

Louisiana-Arkansas Proven Areas

North Louisiana

CADDO—BETHANY

Company, well, farm name, section and block— Remarks:

Tom Collins Pet. Co.'s No. 1 Gill & Lipscomb, 660 ft. N, 1,806 ft. E, SW cor. Sec. 17-16-16 ..... Derrick.

CADDO—BLANCHARD

Louana O. & G. Co.'s No. 1 Winters, 1,980 ft. N, 660 ft. W, SE cor. Sec. 4-18-16 ..... Cmtd. 4½-in. 2,622 ft; T.D. 2,659 ft.

CLAIBORNE PARISH

Haynesville Partnership's No. 1 J. L. Garrett, 300 ft. S and E, NW cor. SW Sec. 25-23-8 ..... Coring anhydrite 4,389 ft.

DE SOTO PARISH

P. B. Dyer's No. 1 B. F. Jenkins, SE cor. NW SW Sec. 25-13-13 ..... Cmtd. 6-in. 2,410 ft; T.D. 2,436 ft.

MOREHOUSE PARISH

The Texas Co.'s No. 1 Sisson, 300 ft. N, 320 ft. E, center Sec. 20-22-2 ..... Drlg. 1,843 ft.

United Gas Public Service Co.'s No. 28 Crossett, 1,991 ft. E, 2,640 ft. S, NW cor. Sec. 27-21-4e ..... Began drlg. June 7; cmtd. 10-in. 163 ft.; 9-in. 861 ft.

OUACHITA PARISH

Inabent & Pipe's No. 2 Van Horn, Sec. 14-18-4..... Cmtd. 6-in. 2,192 ft.

SABINE PARISH—ZWOLLE

Baird Bros.' No. 1 Trammell, 600 ft. N, 330 ft. W, SE cor. NE Sec. 30-8-11 ..... S.D. 1,508 ft.

Bryant & Lucas' No. 1 Andries, 360 ft. S, 350 ft. W, NE cor. NW SE Sec. 15-7-11 ..... Began May 7; 10-in. 41 ft; S.D.

Byers et al's No. 1 Ervin & Bishop, 550 ft. E, 450 ft. N, SW cor. Sec. 16-7-11 ..... S.D. 2,460 ft.

J. C. Chandler's No. 1 Rains, SW cor. NW Sec. 14-7-11.. Derrick.

T. E. Kelly's No. 1 McClanahan, 1,000 ft. S, 330 ft. E, NW cor. SW NW Sec. 36-8-11 ..... Derrick pattern.

H. C. Mauilding's No. 1 DeLatin, Sec. 3-7-11..... Drlg. 550 ft.

Ben Merritt et al's No. 1 L. A. Cook, 336 ft. N, 333 ft. W, SE cor. Sec. 34-8-11 ..... W.O.S.R.; 1,000 ft. oil in hole; T. D. 2,560 ft.

E. F. Neely's No. 1 Garner, SE cor. SW NE Sec. 15-7-11.. Tested dry 2,750 ft; W.O.

Pugh-Hickman Drlg. Co.'s No. 7 Blackman, 330 ft. N and E, SW cor. NE NW Sec. 36-8-13 ..... Top marl 2,207 ft; 6-in. with packer 2,328 ft; dry 2,510 ft; bailing 2,538 ft.

Robertson Drlg. Co.'s No. 2 Hughes, 330 ft. S, 660 ft. W, NE cor. SW NW Sec. 36-8-13 ..... Cmtd. 6-in. 2,265 ft.

Scully & Beach's No. 2 Lafitte, 1,010 ft. S, 134 ft. E, NW cor. Sec. 12-7-11 ..... T.A. 2,636 ft.

Service Drlg. & Royalties Corp.'s No. 2-B Gardner, 330 ft. S and W, NE cor. SW NW Sec. 7-7-10 ..... Began drlg. June 9; cmtd. 10-in. 42 ft; drlg. 670 ft.

C. H. Tuttle's No. 4 Byrd, 300 ft. S, 930 ft. E, NW cor. NW NW Sec. 7-7-10 ..... Derrick.

Mississippi

RANKIN COUNTY

Love Pet. Co.'s No. 1 fee, 300 ft. S, 100 ft. E, NW cor. NE NE Sec. 1-5-1e ..... Rig up.

Wildcat Operations in Southwest Texas

(Continued from Page 110)

O. L. Ray's No. 1 Thos. Dillon, 3,500 feet from NW line, 1,750 ft. from most southerly SW line of de Luna grant in southern part of county ..... T.D. 680 ft; standing.

J. Morgan Russell's No. 2 Brotze, 200 ft. W of No. 1, in Cordenas Sur. ..... T.D. 340 ft.; standing.

Earl S. Post's No. 1 Bilhartz, 1,265 ft. from W line, 2,169 ft. from S line of 385-ac. tract in F. Rolen Sur. No. 48 ..... T.D. 784 ft; pulling csg.

C. A. Smith's No. 1 Henry Lamb, 750 ft. from N and E lines of Lamb farm, in de la Garsa grant ..... Spudded in and waiting for heavier rig.

Tipton's No. 1 Gembler, 514 ft. from W line, 616 ft. from N line of 120-ac. tract in M. Gotari Sur. ..... Spudded in.

BLANCO COUNTY

Blanco Development Co.'s (McGee) No. 1 A. J. Dittmar, 1,320 ft. from S line, 150 ft. from W line of George Evans Sur. No. 58, 4 miles NW of Johnson City ..... T.D. 275 ft.; S.D.

C. L. McLeary's No. 1 Mier, 600 ft. from SW line, 1,-000 ft. from SE line of George Schenling Sur. No. 154. T.D. 860 ft; standing.

Isham et al's No. 1 Lester ranch, 200 varas from N and E lines of Antonio Bandrand Sur., 8 miles NE from Johnson City ..... T.D. 100 ft.; drlg.

CALDWELL COUNTY

Cargill et al's No. 1 Brown, 1,600 ft. from E line, 330 ft. from S line of C. E. Brown 112-ac. tract, Dillard Cooper Sur. ..... T.D. 897 ft.; drlg.

De-Tex Oil Co.'s No. 1 Louis Rogers, 900 ft. from NE line, 400 ft. from SE line of 78-ac. tract in A. Floyd Sur. ..... T.D. 2,525 ft.; drlg.

R. L. Hope and Joe Cole's No. 1 Mike August, 150 ft. from NE line, 185 ft. from NW line of tract ..... T.D. 1,578 ft.; drlg.

F. L. Thompson's No. 1 C. A. Lawler, 5,400 ft. from NE line, 6,900 ft. from SE line of James Berry Sur.. T.D. 2,384 ft.; in Georgetown.

DE WITT COUNTY

L. G. Wade's No. 1 fee, 6 miles S from Yoakum ..... T.D. 2,117 ft.; drlg.

DUVAL COUNTY

Brooklyn Oil Co.'s No. 1 G. W. Sutherland, 2,100 ft. from W line, 1,928 ft. from S line of Sur. No. 157, G.B.&C.N. R.R. ..... T.D. 2,453 ft.; set csg.

Al Buchanan's No. 1 Foster, 150 ft. from N and E lines of N of S of Sur. No. 270 ..... T.D. 2,355 ft.; abnd.

Clark & Miller's No. 1 R. Lopez, 150 ft. from N line, 330 ft. from W line of Sur. 141, S. C. I. Co., 8 miles SW from San Diego ..... T.D. 1,410 ft.; drlg.

M. J. Coffey's No. 1 Parr, 591 ft. from W line, 270 ft. from N of NW cor. of Sec. 2, located in Sur. 27 ..... T.D. 1,700 ft; boiler blew up.

Coronado Oil Co.'s No. 1 Wood-Welder, 1,950 ft. from W line, 950 ft. from N line of Sur. No. 211 ..... T.D. 2,500 ft; P.B. to 2,160 ft.

DeLange & Snider's No. 1 Sanchez, 330 ft. from N and E lines of 80 acres in Blk. 35 of Sur. No. 197 ..... T.D. 1,375 ft.; drlg. sticky shale.

Frank Gravis' No. 3 Schallert, 2,300 ft. from E line, 800 ft. from N line, Sur. 255 ..... T.D. 2,385 ft; tested dry; standing.

Huff et al's No. 1 A. Roach 685 ft. from E line, 43 ft. from S line of Blk. 7, Sur. No. 467 ..... T.D. 200 ft.; spudded in.

G. G. Mortimer's No. 1 Peal, 330 ft. from S and W lines of Sur. No. 792 ..... T.D. 1,670 ft.; drlg.

William B. Stewart's No. 3 Duval County Ranch Co., 200 ft. from E line, 330 ft. from W line of S half of SE, Sur. 363 ..... T.D. 182 ft; drlg.

Whisenant & Trenchard's No. 2 Duval County Ranch Co., 300 ft. from N and W lines of E ½ of SE ¼ of Sur. 76 ..... T.D. 20 ft; set surface csg.

Windsor Oil Co.'s No. 1 Peters, 330 ft. from E line, 2,904 ft. from S line of W ½ of S (or 1,600 ft. to N 2,900 ft. to W of Sur.) No. 32 ..... T.D. 1,660 ft.; drlg.

Wright & Wilson's No. 1 Wood-Welder, 6,150 ft. from N line, 7,300 ft. from W line of Sur. No. 102 ..... T.D. 150 ft; standing.

FRIO COUNTY

Hardy Roberts' No. 1 Burns, Sur. No. 123 ..... Spudded in.

GOLIAD COUNTY

Gillett Oil Co.'s No. 1 Lackey & Weldon, 3,000 ft. NE of Humble test 3 years ago ..... Rigging up.

GUADALUPE COUNTY

J. E. Clark's No. 1 Fritz Drieboldt, 3,000 ft. from NW cor. and 1,900 ft. from N line of John Jones Sur. No. 1 ..... T.D. 1,050 ft.; in Edwards.

HIDALGO COUNTY

Carl & Johnston's No. 1 Doughty, 187 ft. from S and E lines of Lot 11, Blk. 5 of Subd. of Indios Ranch Sur in N. Hidalgo ..... T.D. 2,866 ft.; drlg.

Maxwell & Young's No. 1 King, 175 ft. from N and E lines of Lot 8, Blk. 16, Alamo tract ..... T.D. 125 ft; drlg.

JIM HOGG COUNTY

D. C. DeWitt's No. 1 A. G. Lopez, 3,475 ft. from W line, 425 ft. from N line of Sur. No. 106 ..... T.D. 1,650 ft; standing.

R. F. Foree's No. 1 Holbien, 150 ft. from N and W lines of Blk. 54, Sec. 9 of Holbien Sur. of Share 3 of Las Animas grant ..... T.D. 2,786 ft; setting csg.

Seaton A. Barnes, Jr.'s No. 1 R. Holbien, 220 ft. from W line, 340 ft. from S line, of Blk. 54, share 3, Los Animas tract ..... T.D. 1,665 ft.; drlg.

KENDALL COUNTY

H. W. Martin's No. 1 Houston, in P. Wright Sur. ..... T.D. 585 ft; set csg.

KERR COUNTY

J. E. Anderson's No. 1 J. D. Witt, 1,320 ft. from N line, 1,320 ft. from W line of Sec. 1,923, in Hamilton Sur., 4 miles S of Center Point ..... T.D. 1,418 ft.; drlg.

W. E. Clark's No. 1 Love, 660 ft. from N and W lines of Mrs. Cassandra Winn Sur. No. 1,759 ..... Rigging up.

Eastland Oil Co.'s No. 1 Love, 1,100 ft. SW of Evans & Gant's No. 1 Love ..... T.D. 2,220 ft.; drlg.

KLEBERG COUNTY

Harry Clark's No. 1 V. J. Kivlin, 360 ft. from E line, 400 ft. from S line of Sec. 39, Blk. 3, Kleberg Town & Improvement Co. Sur. ..... T.D. 1,600 ft; S.D.

Harris et al's No. 1 Dennett, 660 ft. from S line, 760 ft. from E line of Blk. 7, Sec. 38, Kleberg Town & Improvement Co. Sur. ..... T.D. 3,100 ft; S.D.

LA SALLE COUNTY

C. B. Bunte's No. 1 Mrs. T. A. Coleman, CNL NE Sec. 68, Poitevant Sur. ..... Derrick.

E. O. Mead's No. 1 Los Angeles Townsite Sur. No. 38 .... T.D. 2,185 ft.; drlg.

W. H. Wallace's No. 1 H. C. Yeager, 150 ft. from S and E lines of Sur. No. 95 ..... T.D. 450 ft.; drlg.

LAVACA COUNTY

Plymouth Oil Co.'s No. 1 Fehrenkamp, SE cor. of 202.8-ac. tract in Moses Mitchell Sur. ..... T.D. 2,500 ft.; drlg.

LEE COUNTY

Paton Bros.' No. 1-B Turner, 424 ft. from NW line, 375 ft. from NE line of 51.9-ac. tract in David Hudson Sur. ..... T.D. 6,540 ft.; drlg. in Georgetown

LIVE OAK COUNTY

S. R. C. Oil Co.'s No. 1 Nichols, 6,400 ft. from SW cor. and 1,150 ft. NE at right angles in Simeon Ryan Sur.. T.D. 830 ft.; drlg.

Whitfield's No. 1 Terrell, David O'Boyle Sur., 5 miles NW from Three Rivers ..... T.D. 920 ft.

McMULLEN COUNTY

Boysen & Hotchkin's No. 1 Hagist, 1,650 ft. from W line, 990 ft. from N line of 160-ac. tract in G. B. Kinney Sur. No. 8 ..... Moving in tools.

Darby Oil Co.'s No. 1 Sling, 150 ft. from S and E lines of NE of B.S.&F. Sur. No. 111 ..... Rigging up.

C. W. Gillette's No. 1 J. Dickinson 100 acres, 740 ft. from NW line, 750 ft. from NE line in Blk. B-29, A. Barrera Sur., 5 miles W from Whitsett ..... T.D. 1,004 ft.; abnd.

Donald Lain's No. 1 Two Rivers ranch, 800 ft. from E line, 1,200 ft. from S line of SE Sec. 25, Two Rivers Ranch Subd. of Live Oak County School land ..... Moving in rig.

C. B. Loftin's No. 3 R. H. Brown, 5,283 ft. from N line, 924 ft. from E line of 3,006-ac. tract in Sur. No. 64 ..... T.D. 768 ft.; abnd.

C. R. Pope, Inc.'s No. 1 A. C. Miles, 300 ft. to E line, 2,375 ft. to S line, Sur. 149 ..... T.D. 2,165 ft.; drlg.

S. R. C. and Sinclair Prairie's No. 2 LaChusa, 330 ft. from S and E lines of NW Sec. 36, Sur., 2 miles E from No. 1 ..... T.D. 2,500 ft.; drlg.

Shumway et al's No. 1 Wulf, Sur. 4 miles SE from No. 2 Shiner, 1,730 ft. from S line, 167 ft. from W line of Steinhardt Sur. No. 190 ..... Spudded in.

Whitfield's No. 1 Jacob, 1,335 ft. from S line, 355 ft. from E line of NE Sec. 9, of Jacob ranch, T.&N.O. R.R. Sur., 1 mile NW from Jacob Pool ..... T.D. 924 ft.; reaming to set csg.

SAN PATRICIO COUNTY

George W. Scruggs' No. 1 Collins, 1,040 ft. from NE line, 700 ft. from SE line of Blk. 36, E. J. McGloin Sur. ..... T.D. 2,754 ft; changing to heavier rig.

STARR COUNTY

B.&B. Oil Co.'s No. 1 Crown Brick & Tile Co., 1,800 ft. S of State Highway No. 4 and 550 ft. from W line of Porcion 87, near La Puerta ..... T.D. 4,532 ft.; tested small amount of gas; fishing for drill pipe.

Chiquita Oil Co.'s No. 1 Starr County Cattle Co., 341 ft. from W line, 371 ft. from S line of Share 60, Partition of Porcions 88 and 89 ..... T.D. 618 ft; drlg.

F. R. Cooper's No. 1 J. M. Martinez, 150 ft. to S and E lines of A.B.&M. Sur. No. 185 ..... T.D. 2,280 ft.

F. Davenport's No. 2 fee, 660 ft. from SE line, 350 ft. from SW line, Sur. 33 of C. O. Newman Subd. of El Benadito grant ..... T.D. 500 ft; standing.

Dawson et al's No. 5 Margo, 1,000 ft. from W line, 5,-500 ft. from S line of Share 2-B, Por. No. 76, jurisdiction Mier ..... T.D. 500 ft; standing.

E. H. Stickney's No. 1 H. Gonzales, 300 ft. from E line, 3,166 ft. from S line of H.E.&W.T. Sur. 339....T.D. 1,100 ft.; drlg.
Sun Oil Co.'s No. 1 Guerra, 1,140 ft. from W line, 6,-955 ft. from S line of 1,360-ac. tract in Share 14-B of Las Quevitasb grant'.....T.D. 2,218 ft.; tested 20,000,000 ft. gas; setting csg.
Goodwain & Yantis' No. 1 Seabury, 150 ft. from S and W lines of Sec. 107, Share No. 1, Porcion No. 107....T.D. 820 ft.; drlg.

TRAVIS COUNTY

F. Fuch's No. 1 Rummell, 300 ft. to S line, 150 ft. to E line of 169-ac. tract in Peter Cartwright Sur. ..T.D. 65 ft.; abnd.

UVALDE COUNTY

Frank A. Brown's No. 1 J. A. Milliken, 1,300 varas from W line which is Sabinal River, and 108 varas from S line of Antonio Cruz Sur. No. 383 .....T.D. 100 ft.; standing.
Evans & Thompson's No. 1 Farris, 400 ft. from S and W lines of 636-ac. tract near center of John J. Hammond Sur. .....T.D. 300 ft; changing rigs.

WEBB COUNTY

Edwin M. Jones' No. 2 Callaghan, 330 ft. from S and E lines of C.C.S.D.&R.G.N.G. R.R. Sur. No. 1,211....Rigging up.
J. W. Edwards' No. 1 Volpe Bros., 150 ft. from E line of NE SW Sec. 17, Blk. 2, C.C.S.D.&R.G.N.G. Sur., 20 miles SE from Cactus .....T.D. 2,260 ft.; abnd.
J. W. Edwards' No. 1 Boltz, 1,170 ft. from S and E lines of Sec. 58, Blk. 2, C.C.S.D.&R.G.N.G. Ry. Sur...T.D. 600 ft.; drlg.
O. W. Killam's No. 1 V. Pena, Sur. Ratones ranch Dolores Subd. Borrego grant .....Spudded in.
Will Ohlhausen's No. 1 Moses Jones, 273 varas from E line, 516 varas from S line of 100-ac. tract in Sur. No. 1,640 .....T.D. 850 ft; drlg.
Shankle & Roche's No. 1 W. W. Stell, 660 ft. from N and W lines of NW NW of No. 37 Sur., 11 miles N from Mirando City .....T.D. 2,500 ft.; S.D. at contract depth.

WILLIAMSON COUNTY

Bob Fallin's No. 1 Polsin, 1,000 ft. from N and E lines of Jacob Sapington, NE from Round Rock .....T.D. 1,855 ft.; in Edwards; S.D.

WILSON COUNTY

Humble Oil & Refining Co.'s No. 1 Hardy, 607 ft. from S line, 466 ft. from E line of Hardy 65-ac. tract in Joseph Reynolds Sur. .....T.D. 1,233 ft.; drlg. rock.
Sexton Pet. Co.'s No. 1 Joe Gutseit (1,032-ac.), 150 ft. from W line, 150 ft. from S line of road of F. Flores No. 15 Sur. .....T.D. 175 ft; drlg.

ZAPATA COUNTY

Hamilton, Brower & Crow's No. 1 Slator, 2,111 ft. from SW line, 1,930 ft. from SE line of Blk. 1, Subd. of Slator ranch in J. V. Borrego grant .....T.D. 1,278 ft.; laying water line.
Circle W. Oil Co.'s No. 1 M. Garza est., 623 ft. from NW line and 699 ft. from SW line of Blk. 30, C. A. Douglas Subd. of Charco Co la India grant .....Rigging up.
O. W. Killam's No. 1 V. Pena, 1,350 ft. from N line, 4,790 ft. from W line of Ratones ranch subd. of Borrego grant .....T.D. 1,037 ft.; drlg.
Sarah Poppas' No. 1 Juan V. Cueller, Jr., 150 ft. from NE and SE lines of Blk. 3, Sur. 2 of Poppas Subd. of Por. 34 .....T.D. 635 ft.; drlg.
A. C. Savey et al's No. 1 Flores, 150 ft. from NW line, 306 ft. from NE line of Blk. 8, Share 1 of P. A. Richer Subd. of Porcion No. 36 .....T.D. 2,404 ft.; drlg.
Stevens & Brown's No. 1 Alexandro Garcia, 660 ft. from SW line, 660 ft. from NW line of Blk. 6, Stevens & Brown Subd. of W 700 acres, Charco Redondo grant, A. Garcia tr. 16 miles SE of Zapata .....T.D. 700 ft.; drlg.
A. H. Wray's No. 1 Gopher Trust Est., in Fullerton Subd. of Share 8 of J. V. Borrego grant .....T.D. 370 ft; reaming to test.

ZAVALA COUNTY

Zavala O. & G. Co.'s No. 1 Gates, 1,320 ft. from N line, 1,220 ft. from E line of Hooper & Wade Sur. No. 13..T.D. 5,845 ft.; drlg.

Southwest Texas Proven Areas

Week Ending June 17

HILBIG POOL—BASTROP COUNTY

Company, well farm name, section and block—	Remarks
Humble O. & R. Co.'s No. 4 Wilhelm, 850 ft. from E line, 466 ft. from S line of Ed Wilhelm 222-ac. tract in Mayes Sur.	T.D. 2,570 ft.; comp. 20 bbls. hrly.
Humble Oil & Refining Co.'s No. 3 Annie Hassler, 295 ft. from W line, 1,205 ft. from S line of Wolfensbarger Sur.	Rigging up.

RIDDLE POOL—BASTROP COUNTY

Marts & Beavens' No. 1-A Riddle (202-ac.)	T.D. 1,560 ft.; drlg.
Ogden & Reed's No. 1 Talley, 150 ft. from NW line, 1,350 ft. from SW line of John Maxmillan Sur.	T.D. 2,124 ft; P.B.

TULETA POOL—BEE COUNTY

Grisham et al's No. 1 Rapp & Hatch, 1,700 ft. from N line, 2,640 ft. from E line, Sec. 12 of Ragsley's Subd. of Uranga grant	T.D. 2,300 ft.; drlg.

ECKERT POOL—BEXAR COUNTY

J. F. Harrison's No. 1 F. Gembler, 150 ft. from NW line, 460 ft. from NE line of 88-ac. tract in J. Montez Sur.	Spudded in.

EAST COLE POOL—DUVAL COUNTY

Cole & Wise's No. 1 S. Benavides, 150 ft. from SW and NW lines of Blk. 415, Myrtle E. Hale Subd. of Mariana Arispe grant	Rigging up.

NORTH GOVERNMENT WELLS POOL—DUVAL COUNTY

Central Producers, Inc.'s No. 7 Tuck & Johnson, 330 ft. from S and W lines of SE SW of Sur. No. 42	Rigging up.
Hester Bros.' No. 1 fee, 330 ft. from S and E lines of NE of Sur. No. 47	Rigging up.
Humble Oil & Refining Co.'s No. 5 C. W. Hahl, 990 ft. from S line, 330 ft. from W line of E half of Sur. 360	Rigging up.
Navarro Oil Co.'s No. 19 Hahl, 990 ft. from S and E lines of W½ of Sur. No. 360	T.D. 2,315 ft.; comp. 35 bbls. hrly.
Southwest Drlg. Co.'s No. 9 Wendt, 990 ft. from S and E lines of SE of Sur. No. 43	T.D. 2,297 ft.; comp. 69 bbls. hrly. on ⅝-in. choke.
Sun Oil Co.'s No. 3 Welderkehr, 990 ft. from S line, 330 ft. from E line of Sur. No. 359	T.D. 2,356 ft.; comp. 15 bbls. hrly.

SARNOSA POOL—DUVAL COUNTY

Sun Oil Co.'s No. 3 Cano, 330 ft. from NE and SE lines of Sur. No. 576	Rigged up.

PETERS POOL—DUVAL COUNTY

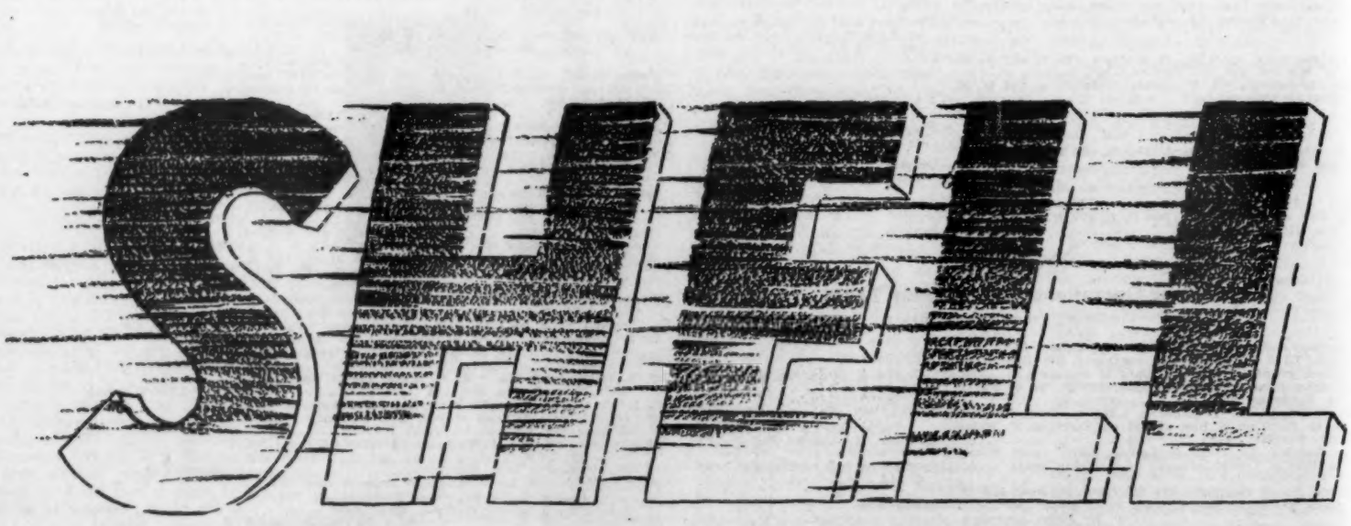
Shasta Oil Co.'s No. 4 Peters, 990 ft. from E line, 330 ft. from S line of Strip Sur. No. 65	T.D. 2,358 ft.; tested water; coring ahead.

SANDIA POOL—JIM WELLS COUNTY

Crude Oil Royalty Co.'s No. 1 Allen, 150 ft. from N and E lines of Blk. 2, Subd. of Wade ranch	T.D. 2,648 ft; set csg.

JACOB POOL—McMULLEN COUNTY

Loma Oil Co.'s No. 13-A Jacob, 1,320 ft. N, 15 deg. E from No. 12-A	Moving in rig.
Loma Oil Co.'s (Jacob, Buzzini & Pickett) No. 12-A Jacob, 1,312 ft. from N line, 571 ft. from E line of W. H. Jacob Sur. No. 10	T.D. 927 ft.; comp. 100 bbls.
Longhorn Oil Co.'s No. 2-A C. T. Lark, in E. B. Scrugham Sur.	T.D. 1,020 ft; recmtng. csg.



WENTZ POOL—McMULLEN COUNTY

V. G. Schimmel's No. 2 H. F. C. Wulf, 150 ft. from S line, 660 ft. from W line of W of NW of Sec. 72, Two Rivers Ranch ..... T.D. 800 ft.; drlg.

KING POOL—NUECES COUNTY

John F. Camp's No. 1 King, 150 ft. from N and W lines of E½ of Sec. 29, of Richard King Subd. ..... T.D. 500 ft.; drlg.

SAXET FIELD—NUECES COUNTY

C.N.T. Co.'s No. 1 L. M. Vance, 330 ft. from E line, 1,320 ft. from S line of 255-ac. tract in Sur. 492.. T.D. 5,012 ft; S.D.

Gibson Oil Corp.'s No. 2 Rand Morgan, 1,320 ft. from N line, 330 ft. from E line of lease ..... T.D. 5,180 ft; S.D.

Gulf Port Oil Co.'s No. 3 Frank Bliss, 1,699 ft. to N line, 350 ft. to E line of 235-ac. tract in J. W. Stevens Sur. No. 406 ..... T.D. 5,616 ft; standing.

Gulf Port Oil Co.'s No. 1 Rand Morgan, 330 ft. from N and E lines of 80-ac. lease ..... T.D. 4,905 ft.; S.D.

MATHIS POOL—SAN PATRICIO COUNTY

Geo. W. Scruggs' No. 1 Collins ..... T.D. 2,756 ft.; changed to heavier rig.

LOS OLMOS POOL—STARR COUNTY

Hooks & Weaver's No. 15 Kelsey Bass, 200 ft. from W line, 150 ft. from S line, NW SE Sec. 6, Pors. 75, 76, 77, Jurisdiction Camargo ..... T.D. 2,150 ft.; drlg.

Hooks & Weavers' No. 14-A3 Kelsey Bass, 200 ft. from W line, 350 ft. from S line of E 30 acres of NE SW Sec. 4, Pors. 75, 76, 77, Camargo ..... Drlg. 1,268 ft; moving in larger rig.

LAUREL POOL—WEBB COUNTY

Montex Oil Co.'s No. 1 Laurel, 150 ft. from S and E lines of Blk. 4, Sur. No. 270 ..... T.D. 290 ft; drlg.

Montex Oil Co.'s No. 1 Caltex Royalty Co., 450 ft. from N line, 150 ft. from E line of Blk. 12, Sur. No. 768.. T.D. 2,145 ft.; set csg.

Montex Oil Co.'s No. 1 Laurel, 150 ft. from NW and SW lines of Blk. 1, Sur. No. 719 ..... Derrick.

Shankle & Newton's No. 1 S. Benavides, 330 ft. from S and E lines of Blk. 13, in No. 3,372 Sur. ..... T.D. 40 ft; set surface csg.; W.O.C.

South Texas Oil Co.'s No. 7 Laurel, 330 ft. from N and W lines of Blk. 13, Sur. No. 270 ..... Comp.; swabbed 50 bbls. daily.

Texas Unity Co.'s No. 1 Yeager, 1,325 ft. from N and W lines of A.B.&M. Ry. Sur. No. 52 ..... T.D. 1,315 ft.; standing.

MOCA POOL—WEBB COUNTY

Moca Oil Co.'s No. 4 Duval County Ranch Co., 810 ft. from N line, 130 ft. from W line of Blk. 32, Share 3, Zapata County School Land ..... T.D. 1,214 ft.; P.B. to 891 ft.

D. R. Semmes' No. 1 Duval County Ranch Co., 510 ft. from N line, 1,690 ft. from E line of Lot 22, League 3 of Zapata County School Land ..... T.D. 891 ft.; standing 700 ft. in oil; going on pump.

D. R. Semmes' No. 2 Duval County Ranch Co., 150 ft. from N line, 1,540 ft. from E line, Lot 22, League 3 of Zapata County School Land ..... Spudded in.

CHAPMAN POOL—WILLIAMSON COUNTY

Deep Pay Exploration Co.'s No. 1 M. V. Lawrence, 227 ft. from W line, 86 ft. from S line of S. Miller Sur. ..... T.D. 2,860 ft.; fishing.

ESCOBAS POOL—ZAPATA COUNTY

Lefevre et al's No. 1 M. Garza Hrs., 330 ft. from NW and SW lines of Blk. 53, C. A. Douglas Subd., Zerro ranch, Comitas Grant Sur. .. .. T.D. 1,800 ft.; abnd.

The Texas Co.'s No. 28 Measles, 533 ft. from SE line, 16,681 ft. from SW line of Cerrito Blanco grant .... T.D. 1,215 ft.; comp. 50 bbls. hrly.

The Texas Co.'s No. 29 Measles, 740 ft. from SE line and 17,891 ft. from SW line of Cerrito Blanco grant.. Rigging up.

LAUREL POOL—ZAPATA COUNTY

South Texas Oil Co.'s No. 8 Laurel, 540 ft. from S line and 1,102 ft. from W line of Blk. 13, Sur. No. 270 ... Rigging up.

MIRANDO VALLEY POOL—ZAPATA COUNTY

J. W. Edwards' No. 1 R. Hinnant, 150 ft. from SE lines of Blk. 4, Sur. No. 116 ..... T.D. 320 ft.; drlg.

Gulf Coast Fields and Wildcats

(Continued from Page 112)

Humble O. & R. Co. and Gulf Prod. Co.'s No. 1-C Lockwood & Sharp, J. Rabb Sur., 833 ft. E of No. 17-A L. & S. ..... Drlg. hard sand 3,475 ft.

Humble O. & R. Co. and Gulf Prod. Co.'s No. 14 Lockwood, J. Rabb Sur., 311 ft. from N line, 3,492 ft. from W line ..... Drlg. shale 3,630 ft.

Powers Prod. Co.'s No. 1 Fred Weisse, Samuel Kennedy Sur., 300 ft. N of S line in center E and W of 10-ac. tract ..... Drlg. gumbo 954 ft.

HIGH ISLAND—GALVESTON COUNTY

Yount Lee Oil Co.'s No. 3 Broussard, M. Dunman Sur., 150 ft. E of center of W line of tract ..... Pulling screen to W.O. 5,475 ft.

Yount Lee Oil Co.'s No. 1-B Broussard & Orme, 126 ft. E of center of W line of M. Dunman Sur. ..... Derrick.

Yount Lee Oil Co.'s No. 35 Cade, N. Fitzsimmons Sur., 600 ft. S of No. 34 ..... Drlg. shale 5,597 ft.

Yount Lee Oil Co.'s No. 36 Cade, N. Fitzsimmons Sur., 600 ft. from S line, 240 ft. E of No. 34 ..... Drlg. gumbo 1,920 ft.

Yount Lee Oil Co.'s No. 16 Smith, Martin Dunman Sur., 300 ft. SE of No. 12 and parallel to land line ..... Drlg. shale 5,833 ft.

Yount Lee Oil Co.'s No. 17 Smith, M. Dunman Sur., 300 ft. SW of No. 14 ..... Drlg. shale and lime 2,720 ft.

ARIOLA—HARDIN COUNTY

Republic Prod. Co.'s No. 3 Ariola fee, Ariola Sur., 400 ft. S of No. 1 ..... Rigging up to pump 4,320 ft.

BATSON—HARDIN COUNTY

Danciger O. & R. Co.'s No. 1 Hooks, 95 ft. S, 150 ft. W of NE cor. of Strip 13, Donoghue Sur. ..... Sandy shale 4,642 ft; fishing core barrel.

PIERCE JUNCTION—HARRIS COUNTY

Rio Bravo Oil Co.'s No. 11-A Settegast (W.O.), J. Kopman Sur., 650 ft. from N line, 350 ft. from E line of lease ..... Drlg. sandy shale and shell 4,889 ft.

TOMBALL—HARRIS COUNTY

Humble O. & R. Co. and Magnolia Pet. Co.'s No. 1 Fritz Kobs, J. N. Hooper Sur., 1,645 ft. S, 330 ft. W. of NE cor. of lease ..... Spudded.

Humble O. & R. Co. and Magnolia Pet. Co.'s No. 1 Herbert Reid, Chauncy Goodrich Sur. ..... Rig.

Humble O. & R. Co. and Magnolia Pet. Co.'s No. 1 G. W. H. Martens, lower W. Hurd Sur., center of 320-ac. tract ..... Gumbo 1,122 ft; cmtd. 10¾-in. csg.

Lavender & Smith's No. 1 Herman Teske, J. Duckworth Sur., 150 ft. from S line, 134 ft. from E line of 160-ac. lease ..... Derrick.

Magnolia Pet. Co. and Humble O. & R. Co.'s No. 1 Wm. Rudel (63 acres), Joseph House Sur., 350 ft. out of SW cor. of lease ..... Drlg. shale 1,599 ft.

Magnolia Pet. Co. and Humble O. & R. Co.'s No. 1 Martens, Joseph House Sur., 600 ft. from W line and 5,600 ft. from S line of tract ..... Drlg. sandy shale 7,032 ft.

Polk Drlg. Co.'s No. 1 Malcomson, A. Schouten Sur., 500 ft. from N line and 1,500 ft. from E line of 283-ac. Daniel's tract ..... S.D. in sticky shale 1,866 ft.

H. H. Sloan's No. 1 Peden, 750 ft. from N line and 1,000 ft. from W line of John Brock Sur. ..... S.D. 5,045 ft.

SARATOGA—HARDIN COUNTY

Rio Bravo Oil Co.'s No. 98 Jordit, Jordit Sur. ..... Rig standing.

Rio Bravo Oil Co.'s No. 97 Jordit, Jordit Sur. ..... Sand 945-77 ft; set 24¾ ft. of 4¾-in. screen; pumping.

Seven Wells Corp.'s No. 1 Teels, T. C. Gaines Sur., NW cor. of 883-ac. tract ..... Drlg. sandy shale 4,350 ft.

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TULSA, 409 East Archer St. . . . . Gordon Thomason, Mgr.

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HOUSTON, TEXAS

Producers, Transporters, Refiners and Marketers of Petroleum and Its Products.

HANKAMER—LIBERTY COUNTY

Gulf Prod. Co.'s No. 1 Crewe & Jacobs, H.&T.C. Sur., Sec. 31, 900 ft. from W line, 1,700 ft. from S line of N 320 ac. of section ..... Drlg. shale 6,530 ft.

HULL—LIBERTY COUNTY

W. B. Flynn's No. 1 Cantor, Jesse DeVore Sur., 150 ft. E and 100 ft. N of SE cor. of tract ..... No report.

Mirmar Oil Co.'s No. 1 Hannah, Jesse DeVore Sur., 750 ft. from E line, 250 ft. from N line of 10-ac. tract.. No report.

The Texas Co.'s No. 8 Hannah (W.O.), Jesse DeVore Sur. ..... T.D. 5,117 ft; drlg. sidetracked hole 4,968 ft.

CONROE—MONTGOMERY COUNTY

Alpha Pet. Co.'s No. 4-A Krohn, S. H. Bryan Sur., 791 ft. N of No. 3-A ..... Spudded.

Alpha Pet. Co.'s No. 1-B Krohn, S. H. Bryan Sur., center of 20-ac. tract ..... Rigging up.

Alpha Pet. Co.'s No. 5 Keystone Mills, L. Smith Sur., 466 ft. out of NW cor. ..... Drlg. shale 4,820 ft.

E. S. Craft's No. 1 Granger, T.&N.O. Sur. No. 14, 467 ft. out of NW cor. of 77-ac. lease ..... T.D. 5,057 ft; cmtd. 7-in. csg. 4,933 ft.

Gulf Coast Drlg. & Prod. Co.'s No. 8-B Keystone Mills, A. Steele, 3,771 ft. from E line, 467 ft. from S line.. Comp. 70 bbls. per hour; ⅛-in. choke, 5,121 ft.

Harrison & Abercrombie's No. 5 Ben Wiggins, T.&N. O. Sur. No. 6, 475 ft. from W line, 470 ft. from S line of lease ..... T.D. 5,130 ft; cmtd. csg.

Hooper-Rutherford's No. 4 Hooper, L&G.N. Sur. No. 649.. Drlg. 1,625 ft.

Houston Oil Co.-Tide Water Oil Co.'s No. 3 Dobbins, Ransom House Sur., 425 ft. from N line, 2,549 ft. from W line of lease ..... Set screen 5,106 ft.

Houston Oil Co.-Tide Water Oil Co.'s No. 2 Moore, L. Smith Sur., 250 ft. N line, 456 ft. W line of lease... Rig.

Houston Oil Co.-Tide Water Oil Co.'s No. 3 Moore, L. Smith Sur., 466 ft. out of SE cor. lease ..... Drlg. sticky shale 3,246 ft.

Humble O. & R. Co.'s No. 10 Dobbins, Ranson House Sur., 425 ft. N line, 466 ft. E line of lease ..... Spudded.

Humble O. & R. Co.'s No. 7 Emory, W.C.R.R. Sur. No. 13, 1,020 ft. N of No. 3 ..... Drlg. shale 2,556 ft.

Humble O. & R. Co.'s No. 36 Madeley, Ransom House Sur., 933 ft. NE of No. 31 and 570 ft. NW at right angles to most southerly line of lease ..... Drlg. shale 3,092 ft.

Humble O. & R. Co.'s No. 20 Moore, L. Smith Sur., 998 ft. SW of No. 22 ..... Drlg. shale 970 ft.

Humble O. & R. Co.'s No. 35 South Tex. Dev. Co., Theo. Slade Sur., 1,095 ft. NE of No. 34 ..... Drlg. shale 3,339 ft.

Humble O. & R. Co.'s No. 1 Stream, C. A. West Sur., 720 ft. N, 620 ft. E of Navarro Oil Co.-Standard's No. 1 Meyers ..... Drlg. shale 4,634 ft.

Humble O. & R. Co.'s No. 3 Wiggins & Athey, L. Smith Sur., 500 ft. from SW line, 800 ft. from SE line.... Comp. 90 bbls. per hour; ½-in. choke, 5,129 ft.

Humble O. & R. Co.'s No. 1 O. Wooten, J. A. Davis Sur., 270 ft. from S line, 200 ft. from W line ..... Rig.

Humble O. & R. Co.'s No. 4 Wiggins & Athey, L. Smith Sur., 865 ft. SW of No. 1 ..... Drlg. 80 ft.

W. M. Massie's No. 4 Hooper, F. Hooper Sur., 2,604 ft. from N line in center E and W ..... Drlg. sand 5,095 ft.

Navarro Oil Co. and Farlyn Oil Co.'s No. 1-B House, W.C.R.R. Sur. No. 14, 675 ft. from W line and 330 ft. from S line of 20 acres ..... Drlg. sand and shale 5,060 ft.

Neversuch Oil Co.'s No. 5 South Tex. Dev. Co., T.&N. O. Sur. No. 5, 573 ft. from N line and 335 ft. from E line ..... Sand 5,095 ft.

Republic Prod. Co.'s No. 1 Dudley, C. B. Stewart Sur., 466 ft. from N line and 466 ft. from E line of lease.. Hard sand 5,164 ft.

Standard Oil Co. of Kansas' No. 1-B Madeley, Ransom House Sur., 400 ft. from N line, 300 ft. from W line ..... Sand 5,128 ft.

Sun Oil Co.'s No. 1 Clark, Wilson Strickland Sur., 409 ft. from N line, 467 ft. from E line ..... Cmtd. csg. 5,056 ft.

Sun Oil Co.'s No. 7 Foster, John Bricker Sur., 933 ft. W of No. 3 and 467 ft. from N line ..... Drlg. shale 4,929 ft.

Sun Oil Co.'s No. 9 Foster, John Bricker Sur., 1,124 ft. NE of No. 4 ..... Sand and shale 5,125 ft.

Sun Oil Co.'s No. 10 Foster, John Bricker Sur., 933 ft. SE of No. 5 ..... Spudded.

Sun Oil Co.'s No. 1 McDonald, Wilson Strickland Sur., 469 ft. from W line, 409 ft. from N line ..... Rig.

The Texas Co.'s No. 3 Dudley, C. B. Stewart Sur., 466 ft. out of NW cor. of lease ..... Drlg. gumbo 5,019 ft.

The Texas Co.'s No. 4 Dudley, C. B. Stewart Sur., 466 ft. out of SE cor. of lease ..... Drlg. sticky shale 4,216 ft.

The Texas Co.'s No. 8 Rhodes, 320 ft. S of S line of C. A. West Sur., and 330 ft. W of W line of John Massey Sur. in W. S. Rhodes Sur. ..... Drlg. sticky shale 2,833 ft.

The Texas Co.'s No. 14 Rhodes, W. S. Rhodes Sur., 1,065 ft. from W line, 1,470 ft. from S line ..... T.D. 5,010 ft; drill pipe stuck.

The Texas Co.'s No. 15 Rhodes, W. S. Rhodes Sur., 308 ft. from N line, 288 ft. from E line of lease ..... Drlg. sand and shale 1,015 ft.

The Texas Co.'s No. 16 Rhodes, W. S. Rhodes Sur., 330 ft. S of N line, 467 ft. E at right angles from W line. T.D. 338 ft; cmtd. 16-in. surface pipe 334 ft.

Tide Water Oil Co.'s No. 3 Granger, T.&N.O. Sur. No. 14, 467 ft. from N line and 933 ft. E of No. 1..... T.D. 960 ft; cmtd. 10¾-in. surface csg. 950 ft.

Tide Water Oil Co.'s No. 8 Dean, W. C. C. Lynch Sur., 467 ft. out of SW cor. of lease ..... Comp. 60 bbls. per hour; ½-in. choke, 5,136 ft.

Tide Water Oil Co.'s No. 10 Dean, W. C. C. Lynch Sur., 2,349 ft. from E line, 467 ft. from S line ..... Spudded.

Tide Water Oil Co.'s No. 21 Lewis, C. B. Stewart Sur., 467 ft. out of SE cor. "B" tract ..... Derrick.

Tide Water Oil Co.'s No. 22 Lewis, C. B. Stewart Sur., 1,400 ft. from W line, 2,015 ft. from S line "A" lease. Spudded.

LIVINGSTON—POLK COUNTY

Shell Pet. Corp.'s No. 1 Munson, A. Viesca Sur., 330 ft. out of NE cor. of tract ..... Derrick.

REFUGIO—REFUGIO COUNTY

United Prod. Corp.'s No. 1-A M. F. Lambert, 466 ft. from N line, 833 ft. from W line of Hews & Brown Sur. ..... Coring sand and shale 5,932 ft.

HUMBLE—HARRIS COUNTY

The Texas Co.'s No. 22 House (W.O.), M. Owens Sur. .. T.D. 5,057 ft.; sidetracked 4,146-4,480 ft.; set screen.

Rosenthall & Hefferman's No. 1 Westheimer, John B. Jones Sur., 73 ft. due W of Rio Bravo Oil Co.'s No. 1 Westheimer, Blk. 16 ..... No report.

MYKAWA—HARRIS COUNTY

Frederick & Coffelt's No. 1 Irwin, Wm. Lovett Sur., 300 ft. S and E from J. A. Platt vs. G.C.&S.F. conflict cor. of 5,959-ac. tract, W. B. Walker Sur. ..... Drlg. 810 ft.

PORT NECHES—ORANGE COUNTY

The Texas Co.'s No. 1 Orange Nat. Bank, 150 ft. out of NW cor of lease, Jacob Beaumont Sur. ..... Drlg. sand and shell 3,117 ft.

GRETA—REFUGIO COUNTY

E. H. Buckner's No. 1 J. M. O'Brien, 150 ft. S of N line of N. S. Crunk Sur. and 150 ft. NW of St. L.&B. M. R.R. ..... Drlg. sand and shale 3,340 ft.

Greta Oil Corp.'s No. 2 J. M. O'Brien, E. H. Winfield Sur., 150 ft. out of SW cor. of 25-ac. tract ..... Cmtd. 10-in. csg. 893 ft.

Luling O. & G. Co. and Morgan's No. 1 J. M. O'Brien, N. S. Crunk Sur., 150 ft. out of most easterly cor. of 50-ac. tract ..... Spudded.

M. C. McGeehee's No. 1 O'Brien, 3,800 ft. W of most easterly E line and 3,150 ft. N of most southerly S line of E. H. Winfield Sur. ..... Drlg. shale 3,536 ft.

W. L. Pearson's No. 1 Wilson Heard, M. J. Xmines Sur., 1,760 ft. from N line, 1,000 ft. from W line of 240-ac. tract ..... T.D. 2,115 ft; blew out, cratered.

caught fire.

Joe E. Smith's No. 1 O'Brien, 1,500 ft. N of most southerly S line and 1,800 ft. E of most westerly E line of E. H. Winfield Sur. ..... Derrick.
Vidauri Oil Co.'s No. 1 Welder, 330 ft. S of N line of James T. McGrew Sur., and 700 ft. W of R.R. .... Cmtd. 10-in. csg. 1,000 ft.

SOUTH LOUISIANA FIELDS

ASSUMPTION PARISH

Barnsdall Oil Co.'s No. 1 Williams, 330 ft. out of NE cor. Sec. 38-14s-14e ..... Drlg. gumbo 2,964 ft.

BEAUREGARD PARISH

Burnham & Johnson's No. 1 Long Bell, 725 ft. S, 155 ft. E of NW cor. NW NW Sec. 34-2s-8w ..... Sand and shale 2,076 ft; S.D.

CALCASIEU PARISH

Union Sulphur Co.'s No. 1 Stout, 1,327 ft. N, 1,167 ft. W of SE cor. Sec. 36-8s-8w ..... No report.

CAMERON PARISH

Southern Sulphur Co.'s No. 1 Gulf of Mexico, 330 ft. S, 338 ft. E of SW cor. Sec. 29-15s-10w ..... Drlg. gumbo 1,600 ft.
The Texas Co.'s No. 3 State-Calcasieu Lake, 14,255 ft. W, 3,270 ft. N of NE cor. Sec. 1-14s-9w ..... Spudded.

CHOCTAW—IBERVILLE PARISH

Standard Oil Co.'s No. 4 Myrtle Grove, 2,350 ft. S, 150 ft. W of NE cor. NW Sec. 52-9s-11e .. .. Cap rock 2,485 ft.

DARROW—ASCENSION PARISH

Rio Bravo Oil Co.'s No. 1 Community, 200 ft. N line, 1,500 ft. E at right angles from SW cor. Sec. 15-10s-2e ..... T.D. 4,035 ft; cmtd. to 4,020 ft; sidetracked 3,865-4,006 ft.; re-setting screen in sand 4,000-06 ft.

GUEYDAN—VERMILLION PARISH

Pure Oil Co.'s No. 4 Alliance Trust Co., 578 ft. from N line and 1,921 ft. from W line of Sec. 34-11s-1w.. Rig.
Pure Oil Co.'s No. 5 Alliance Trust Co., 525 ft. from N line, 580 ft. from W line of Sec. 34-11s-1w ..... Drlg. sticky shale 1,155 ft.
Pure Oil Co.'s No. 3 Mulvey, Sec. 34-11s-1w, 1,515 ft. from N line, 1,150 ft. from E line of tract ..... Pulling screen 4,870 ft.

LOCKPORT—CALCASIEU PARISH

Magnolia Pet. Co.'s No. 8 State Bayou D'Inde, 865 ft. E, 570 ft. N of SW cor. NE Sec. 8-10s-9w ..... Drlg. sand 4,824 ft.

BLACK BAYOU—CAMERON PARISH

Shell Pet. Corp.'s No. 15 Watkins, 1,890 ft. from N line and 680 ft. from E line of Sec. 18-12s-12w ..... Spudded.

HACKBERRY—CAMERON PARISH

Gulf Ref. Co.'s No. 11 Irwin, Sec. 13-12s-10w, 200 ft. N and 100 ft. E of No. 9 ..... Comp. pumping 100 bbls. daily 3,000 ft.
Gulf Ref. Co.'s No. 12 Irwin, 865 ft. N, 518 ft. E of SW cor. Sec. 44-12s-9w ..... Rig.
Wilfred Lahey's No. 1 Aroux, center 2-ac. tract, Sec. 36-12s-10w ..... No report.
Massert & Cruse's No. 1 Sutton, 656 ft. S, 325 ft. E of NW cor. Sec. 26-12s-10w ..... No report.
Pop Oil Co.'s No. 1 Yount Lee, 3,996 ft. W and 100 ft. N of SE cor. Sec. 19-12s-10w ..... Spudded.
Union Sulphur Co.'s No. 6 Gulf Land-Humble Lease, Sec. 11-12s-10w, 245 ft. W and 210 ft. S of No. 4.... Drlg. shale 5,120 ft.

IOWA—CALCASIEU AND JEFF DAVIS PARISHES

Magnolia Pet. Co.'s No. 1 Bowman, 330 ft. out of NE cor. 8½ NW Sec. 12-9s-7w ..... Drlg. sandy shale 4,189 ft.
Magnolia Pet. Co.'s No. 1 Gillson, 330 ft. out of SE cor. NE Sec. 13-9s-7w ..... T.D. 7,027 ft; cmtd. 7-in. csg. 7,007 ft.
Magnolia Pet. Co.'s No. 1 Willett, 330 ft. N and E out of SW cor. NW Sec. 7-9s-6w ..... Drlg. gumbo 6,085 ft.
Shell Pet. Corp.'s No. 4 Fontenot, Sec. 7-9s-6w, 330 ft. out of NW cor. of lease ..... Drlg. sandy shale 5,425 ft.
Shell Pet. Corp.'s No. 4 Heyd, 2,122 ft. W, 1,310 ft. S of NE cor. Sec. 13-9s-7w ..... Comp. est. 6,000,000 ft. dry gas, 4,362 ft.
Shell Pet. Corp.'s No. 2 Stafford, 330 ft. from W line and 265 ft. from S line of NW Sec. 18-9s-6w ..... Drlg. shale 1,443 ft.

JEFFERSON DAVIS PARISH

Humble O. & R. Co.'s No. 2 Devilbiss, 1,850 ft. S, 250 ft. W of NE cor. Sec. 14-9s-4w ..... Shale and lime 6,559 ft; cmtd. 9⅝-in. csg.

JENNINGS—ACADIA PARISH

Yount Lee Oil Co.'s No. 13 Houssiere-Latrielle, Sec. 47-9s-2w, 300 ft. E of No. 12 ..... Rigging up.

LA. FOURCHE PARISH

Southern Sulphur Co.'s No. 1 State-Bay Marchand, 617 ft. E, 710 ft. S of SW cor. Sec. 20, in Sec. 29-23s-12e. Spudded.

PORT BARRE—ST. LANDRY PARISH

The Texas Co.'s No. 1 Thompson, 2,593 ft. N, 477 ft. E of SW. cor. Sec. 20-6s-5e ..... Spudded.

STARKS—CALCASIEU PARISH

Union Sulphur Co.'s No. 1 Industrial, 1,916 ft. S, 2,254 ft. W of NE cor. Sec. 30-9s-12w ..... No report.

SWEET LAKE—CAMERON PARISH

Pure Oil Co.'s No. 11 Yount Lee, Sec. 12-13s-8w, 800 ft. S 66 deg. 43 min. from No. 9 ..... Heaving shale 3,070 ft; P.B. to 7,210 ft; sidetracked at 7,154 ft; drlg. sand and lime 7,173 ft.

ST. BERNARD PARISH

Southern Sulphur Co.'s No. 1 State-Lake Borgne, 850 ft. N, 330 ft. E of SE cor. Sec. 33-13s-15e ..... Rig.
Southern Sulphur Co.'s No. 1 Lake Levy, 400 ft. S, 500 ft. N of SW cor. Sec. 22-13s-15e ..... Derrick.

SULPHUR—CALCASIEU PARISH

Union Sulphur Co.'s No. 744 fee (W.O.), 2 ft. S, 34 ft. W of C Sec. 29-9s-10w ..... Drlg. shale 3,820 ft.
Union Sulphur Co.'s No. 747 fee, 750 ft. W, 5 ft. S of C Sec. 29-9s-10w ..... T.D. 2,797 ft; pulling screen to deepen.
Union Sulphur Co.'s No. 780 fee, 465 ft. N and 536 ft. E of center of Sec. 29-9s-10e ..... Drlg. 3,423 ft.
Union Sulphur Co.'s No. 783 fee, Sec. 29-9s-10w ..... Drlg. 4,435 ft.

TERREBONNE PARISH

The Texas Co.'s No. 2 State-Caillou Island, 1,050 ft. S, 2,770 ft. E of NW cor. Sec. 20-23s-20e ..... No report.
The Texas Co.'s No. 6 State-Dog Lake, 4,067 ft. W, 1,877 ft. N of SE cor. Sec. 31-21s-15e ..... No report.
The Texas Co.'s No. 18 State-Lake Barre, 1,876 ft. W, 651 ft. S of NW cor. Sec. 30, in Sec. 35-21s-20e .... No report.
The Texas Co.'s No. 1 State-Four Isle, 1,300 ft. N, 1,700 ft. W of SE cor. Sec. 22-21s-14e ..... No report.
The Texas Co.'s No. 1 School Board-Bay St. Elaine, 2,350 ft. S, 600 ft. E of NW cor. Sec. 16-22s-18e..... No report.

TEXAS

MISCELLANEOUS WILDCATS

BRAZORIA COUNTY

E. A. Andersen et al's No. 1 Reynold, Johnson, Walker & Borden League, 5,503 ft. from W line, 850 ft. from W line of 132-ac. lease ..... Drlg. gumbo 1,506 ft.
Danciger O. & R. Co.'s No. 3 Hunt, Pledger, 6,550 ft. from E line, 5,550 ft. from S line of W. Carson Sur... T.D. 6,884 ft; sand S.O. 6,861-81 ft; cmtd. 7⅝-in. csg. 6,859 ft.; drilled plug and set screen.
Amerada Pet. Corp. and Rycade Oil Corp.'s No. 4 Seaburn, Austin & Williams Sur., 150 ft. W of No. 3 on line with Nos. 1, 2 and 3 ..... Drlg. shale 3,035 ft.

BRAZOS COUNTY

F. H. Scott's No. 1 Klintworth, I. Curd Sur., 300 ft. NE line, 400 ft. SE line of tract ..... Cmtd. surface csg.

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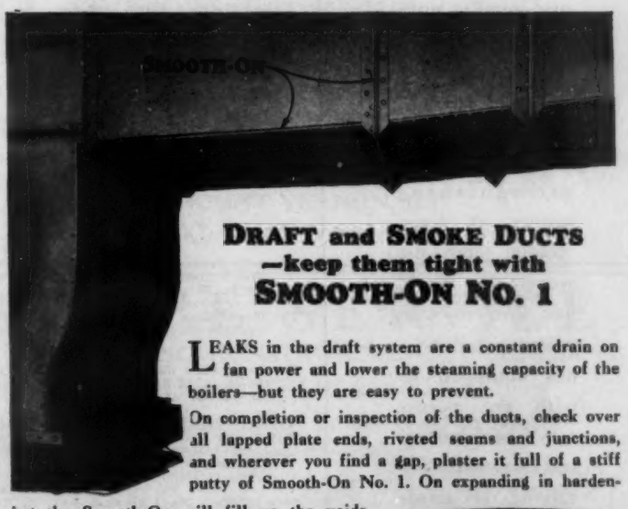

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CHAMBERS COUNTY

Mills & Jones' No. 1 Gan, John S. Roberts Sur., 355 ft. W, 1,952.72 ft. S of NE cor. of 138-ac. tract .... Drlg. gumbo 2,793 ft.

COLORADO COUNTY

Sanciger O. & G. Co. and L. E. Hults' No. 1 C. L. Raver, B.B.B.&C. Sur., Sec. 1, 990 ft. out of SW cor. of 477-ac. tract ..... Shale 4,529 ft.; S.D.

Fabrigus & Poole's No. 1 Lake Side Irrigation, 1,500 ft. SE, 500 ft. NE NW cor. Patrick Real Sur. ..... T.D. 1,445 ft; cmtd. 12¼-in. csg. 1,150 ft.

Humble O. & R. Co.'s No. 1 John McShane, L.&G.N. Sur., Sec. 42, 466 ft. out of NE cor of tract ..... Drlg. hard shale 6,736 ft.

McCullouch Oil Co.'s No. 1 Kansteiner, Lelander Beason Sur., 300 ft. out of NE cor. of tract ..... Rig standing.

Weimar Oil Co.'s No. 1 H. T. Brandt, F. Pettus Sur., 250 ft. from N line, 250 ft. from E line of tract .... Drlg. shale 2,344 ft.

FORT BEND COUNTY

Taylor & DeCosta's No. 1 Naylor, 4,350 ft. N, 55 deg. E from SW cor. 453-ac. tract in Christman Sur. .. T.D. 7,014 ft; P.B. to test at 6,400 ft.; no report.

GRIMES COUNTY

Koch et al's No. 1 Haferkamp, Samuel Fulton Sur., 335 ft. from S line, 347 ft. from E line of 189 acres. Drlg. shale 3,435 ft.

Petroleum Southwest Co.'s No. 1 Greer, Pat O'Connor Sur., 200 ft. from W line, 400 ft. from N line of 150-ac. tract ..... Drlg. shale 2,758 ft.

HARRIS COUNTY

Burns, Ogg & Houston's No. 1 Kenning, H.&T.B. Sur., 330 ft. S line and 550 ft. W line ..... Derrick.

C. & C. Drlg. Co. and Mephail's No. 1 Erhardt, C. H. Deisedenier League ..... Drlg. sand and shale 5,252 ft.

Hamilton et al's No. 1 Hargroves, W. C. Ry. Sur. No. 10, Blk. 1; 1,750 ft. from E line, 645 ft. N line .. Gumbo 1,015 ft; cmtd. 10-in. csg.

Huffman Dome Dev. Co.'s No. 1 E. M. House, Mary McGruder Sur., 590 ft. E of NW cor. H.E.&W.T. Ry. and 954 ft. N at right angles ..... Derrick.

H. B. Jordan's No. 1 Cochran, J. L. Jordan Sur., 1,950 ft. S line, 1,930 ft. E line ..... Drlg. sandy shale 1,010 ft.

Melba Oil Co.'s No. 1 L. B. House, 160 ft. from N line, 600 ft. from E line, Sec. 22, Harris County School Land Sur. ..... Derrick.

Jack Schultz et al's No. 1 Woodburn, 450 ft. NW of center of August Whitlock Sur. ..... Cmtd. 12½-in. csg. 840 ft.

Sinclair Prairie Oil Co.'s No. 1 Kirmayer, Jesse Denton Sur., 357 ft. S, 601 ft. W of SE cor. Mrs. Willie Moore 200-ac. tract in Kirmayer 800-ac. tract ..... Drlg. shale 5,803 ft.

JACKSON COUNTY

The Texas Co.'s No. 1 Mitchell, H. F. Austin League, 450 ft. W, 450 ft. S of NE cor. of 65-ac. tract, Lot 28, Clement Subd. ..... Drlg. sticky shale 5,421 ft.

Turnbull et al's No. 1 Maurita, John Davis Sur., 330 ft. from W line of 200-ac. tract and 380 ft. N of center of G.H.&S.A. Ry. Sur. ..... Dry and abd. 6,039 ft.

JEFFERSON COUNTY

Elam & Denny's No. 2 Broussard, John McGaffey Sur. .. Hard sand 3,440 ft; S.D.

W. J. Parker's No. 1 Rorck, A. Williams Sur. ..... Drlg. shale 1,783 ft.

Sun Oil Co.'s No. 1 Paggi, 990 ft. W, 1,610 ft. N of SE cor. of T.&N.O. Sur. No. 32 ..... Rigging up.

LIBERTY COUNTY

C. G. Hamill's No. 1 McNair, Wm. Harris Sur., 2,700 ft. from E line and 525 ft. from S line of tract .... Dry and abd. 6,100 ft.

Yount Lee Oil Co.'s No. 1 E. W. Boyt, H.&T.C. Sur., Sec. 17, 300 ft. from S line, 2,440 ft. from E line of section ..... Hard sand 9,259 ft; running 7-in. csg.

MATAGORDA COUNTY

Humble O. & R. Co.'s No. 2 Pierce est., 1,900 ft. NE, 466 ft. NW at right angles out of SW cor. of Pierce estate, same being NW cor. of W. S. and L. B. Hunt tract, W. Carson Sur. ..... Drlg. sand 7,788 ft.

United North & South Dev. Co.'s No. 1 Unit 6 (No. 2 Stoddard), 25 ft. each way out of NW cor. of Lot 19, Buckeye Townsite ..... Coring shale 7,814 ft.

United North & South Dev. Co.'s No. 1 Unit 14 (No. 1 Dr. Plotner), 1,210 ft. SE of No. 1 Stoddard and 136 ft. W of right of way of Collegeport branch of St. L.&B.M.R.R., Buckeye ..... Pulling screen to deepen 7,840 ft.

United North & South Dev. Co.'s No. 1 Unit 25, 1,335 ft. S, 1,000 ft. E of No. 1 Unit 6 ..... Drlg. shale 5,943 ft.

MONTGOMERY COUNTY

Fostoria Oil Co.'s No. 1 Foster Lbr. Co., 1,150 varas W, 627 varas N of SE cor. H.T.&B. Sur. No. 2 ..... Derrick.

POLK COUNTY

Carl B. King Drlg. Co.'s No. 1 U. S. Alabama Indian Reservation, 2,348 ft. from SW line, 5,022 ft. from SE line of Thomas Colville Sur. ..... S.W. sand 3,650 ft; abd.

Kirby Pet. Co.'s No. 1 Kirby Lbr. Co., 466 ft. out of NW cor. of James Stephenson Sur. .. .. Dry and abd. 5,304 ft.

REFUGIO COUNTY

Humble O. & R. Co.'s No. 6 O'Connor, L. Serna Sur., 14,375 ft. from S line, 2,932 ft. from W line ..... Drlg. shale 1,925 ft.

TYLER COUNTY

Republic Prod. Co. and Houston Oil Co.'s No. 1,014-E (No. 2 Sterne fee), Adolph Sterne Sur., 1,300 ft. S, 400 ft. W of No. 1 Sterne fee ..... Drlg. shale 6,708 ft.

VICTORIA COUNTY

The Texas Co.'s No. 6-A McFaddin, 5,600 ft. from NE line, 250 ft. from SE line of A. J. Gray ..... T.D. 2,011 ft; pumping wtr. into sand 1,987-2,010 ft. to kill gas pressure.

The Texas Co.'s No. 7 McFaddin, 6,600 ft. S 15 deg. W, 450 ft. N 75 deg. W at right angles from the NE cor. of the A. J. Gray Sur. ..... T.D. 1,176 ft; blowing gas and mud.

WALLER COUNTY

Trapshooter Reilly Oil & Royalty Co.'s No. 1 Menke, Justo Liende Sur., 600 ft. at right angles from NW line at 250 ft. at right angles from E line of 330-ac. tract ..... Drlg. shale 4,893 ft.

WHARTON COUNTY

Pure Oil Co.'s No. 1 Stewart, 2,419 ft. NW, 1,650 ft. NE of S cor. of Sec. 25, Morris & Cummings Sur. .... Drlg. shale 7,488 ft.

Pure Oil Co.'s No. 1 Chas. T. Kuntze, 2,133 ft. from NW line, 467 ft. from SW line, Sec. 27, Morris & Cummings Sur. ..... Moving in rig.

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Rocky Mountain Area

(Continued from Page 120)

trouble with Bentonite and is drilling at 1,304 feet.

Gallatin County

Montana Gas & Petroleum Corp.'s No. 1 Adams, SE cor. Section 35-2n-1e, Three Forks district, is drilling at 1,737 feet.

Yellowstone County

Rice, Fulton and others' No. 1 Hageman, SE Section 20-2n-23, Devil's Hole, is shut down at 3,965 feet.

Golden Valley County

Golden Valley Oil Co.'s No. 1, SW SE SE Section 28-6n-22, Belmont district, is bottomed at 3,570 feet and fishing for bit.

Musselshell County

A new operation is Hawkeye Oil Co.'s No. 1, NW NE NE Section 20-11n-23, Willow Creek district, spudding at 200 feet.

Petroleum County

Oregon-Flatwillow Oil Co.'s No. 1, SE cor. Section 3-13-26, Flatwillow district, which has been shut down for two years at 1,300 feet, is resuming at that depth.

SOUTH DAKOTA

Weaver Oil Co.'s No. 1, NW cor. Section 32-3s-22, Kadoka district, Jackson County, which has been shut down for some time, is resuming at 2,430 feet. Collapsed derrick has been replaced with steel derrick and 8¼-inch has been landed on bottom.

UTAH

In Washington County, Utacal Oil Co.'s No. 18, SE cor. SW Section 12-41s-12w, Virgin Field, was completed for 1½ bbls. per day initial at 636 feet in the Rock Canon member of the Moenkopi. Walklin Petroleum Co.'s No. 6, NW NW Section 13-41-12, was dry and abandoned at 620 feet. Arrowhead Petroleum Co.'s No. 1-A, SE SW NE Section 1-43-15w, Punchbowl district, is fishing for bit at 443 feet. Virgin Dome Oil Co.'s No. 1, NW cor. Section 16-42-14, Harrisburg district, is cleaning out and fishing at 3,000 feet after a shot. It will cement off cavings and resume. Swartzbaugh and others' No. 1, NW SE Section 3-42-11, Virgin district, is shut down at 100 feet.

In Utah County Diamond Oil Co.'s No. 4, SE NW Section 16-8s-5e, is drilling at 3,530 feet and trying for a formation shutoff with the 5⅞-inch.

In Emery County, Pacific Western Oil Co. has taken over the old Castledale Oil Co.'s well in NE SE SE Section 32-18-9e, Castledale district, abandoned in 1924 at 600 feet and is seeking authority from the Geological Survey to resume.

IDAHO

Boise Petroleum Co.'s No. 1 Pence, SE NE SW Section 13-8n-4w, Payette County, is drilling at 2,300 feet in shale.

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La.-Ark. Fields

(Continued from Page 111)

shut down at 3,017 feet, contract depth, without a show that amounted to anything.

Haynesville partnership ran a dry drill stem test on No. 1 Garrett, Haynesville townsite deep test in Haynesville Pool of Claiborne Parish, at 4,300-69 feet and was coring anhydrite at 4,389 feet. The only other deep test in the pool, drilled in 1928, is 2 miles northwest and is still producing at its original rate of 30 bbls. per day from around 4,200 feet. The present test is scheduled to go 4,700 feet "unless." United Gas Public Service Co.'s No. 1 Meadows, Section 15-21-5, Claiborne Parish, was drilling gray shale at 6,057 feet. Its No. 1 Temple, 3 miles east of Haynesville partnership well, was abandoned last week at 4,909 feet as a dry hole.

E. T. Oakes' No. 1 Bryant, DeSoto Parish deep test at Longstreet, which has made indications that it might develop into a wet gasser, was about to get to bottom at 4,660 feet with reaming tool and will probably set the second string, 7-inch, next week and test the week after. There are many features of this test that make it as interesting as any deep hole that has ever been drilled in this territory. Consequently, it is being closely watched, and will furnish much valuable information whether or not it proves to be a producer of either oil or gas. P. B. Dyer's No. 1 B. F. Jenkins, NW SW Section 35-13-12, Naborton district of DeSoto, with 6-inch cemented at 2,410 feet, cored 3 feet of oil sand (Blossom), total depth 2,436 feet. Jack Whitson cored sand showing gas at 2,860-62 feet on No. 2 Sanders, SW SW Section 19-11-13, DeSoto, but did not get a well and was coring at 2,868 feet.

Smith and others' No. 1 Lee Lumber Co., NW SE Section 13-5n-2e, Rapides Parish, with top of the Jackson at 1,210 feet, was drilling at 3,226 feet. Though rather on the north edge of the Conroe-Jackson trend, it is being watched as a marker for that play.

Several wells in the Converse area of Sabine Parish are at interesting stages. Nick Barbare's No. 1 Ryals, NW NW Section 27-9-13, a mile east of production at 1,854 feet, set 4-inch liner at 1,972 feet and was bailing; total depth 1,991 feet. Mamie Hammond's No. 1 Patrick, SW SE Section 1-9-13, 3 miles northeast of production, had a show of gas at 3,012 feet, cored lime from 3,177-88 feet, and was drilling. E. D. Holcomb's No. 2 Shufford, Section 34-8-12, Zwolle district of Sabine Parish, set 6⅝-inch with packer at 2,320 feet, bailed dry at 2,530 feet, used acid, and is waiting orders. Ben Merritt's No. 1 H. A. Cook, SE SE Section 34-8-11, Zwolle, is arranging to pump with 1,000 feet of oil in the hole from 2,560 feet. Pugh-Hickman Drilling Co.'s No. 7 Blackman, NE NW Section 36-8-12, topped the marl at 2,207 feet, set 6-inch with packer at 2,228 feet, was dry at 2,510 feet but had a show of oil at 2,538 feet. Roy Raines' No. 1 Beaird, a wildcat in the SW SE Section 8-8-10, Sabine Parish, was shut down in black shale at 2,325 feet. Llano Del Rio Co-Operative Colony's No. 1 Gulf Lumber Co. fee, SE NE Section 6-1n-9, Vernon Parish, another wildcat on the north edge of Conroe-Jackson trend territory, was drilling at 2,218 feet after a dry test at 1,643 feet and top of the Jackson at 2,062 feet. Talbert, Rowley and Dawson set 12-inch surface string at 114 feet on No. 1 Delta Land & Timber Co., SW SW Section 2-1n-11, Vernon Parish.

ARKANSAS

In Columbia County, C. W. Alworth had 10-inch set at 88 feet on No. 1 King, a 2,500-foot test on a block of 1,000 acres centering on the location in the SE SE Section 16-17-20, and Kendall Oil Co.'s No. 2 Fullenwider, NE NE Section 13-17-12, was shut down at 3,110 feet. Sam Wilson and others' No. 1 Red River Lumber Co., SW SW Section 19-19-25, Lafayette County, shut down at 2,804 feet for the last two months after a show of oil with salt water at 2,786-88 feet, is being refinanced for a test of the Trinity, having been scheduled to go to a maximum depth of 4,500 feet. Lawrence Cook's No. 1 McGehee Planting Co., NE SW Section 5-8-7, Lincoln County, was reaming to bottom, total depth 4,330 feet, as deep as any hole in that part of the State has ever been drilled. American Portland Cement Co.'s No. 1 fee, SW NE Section 21-12-32, Little River County, was shut down at 2,500 feet, in approximately 300 feet of anhydrite.

Miller County was quiet except for three wells and has apparently passed out of the picture, at least for the time being. Fitzwater and others' No. 1 Norsen, SE SW Section 20-15-27, was drilling at 3,020 feet, well below the level at which production was found in the five wells several miles to the northeast. Sam Riggs' No. 1 Boyce, SW NE Section 12-15-27, was shut down at 2,200 feet, and Sorrell and Tidwell's No. 1 McCowan, NW SE Section 22-15-28, was drilling at 2,850 feet. R. E. Collins' No. 1 W. A. Craig, NE SE Section 15-10-29, Sevier County, a rank wildcat, had a show of gas enough to almost make a commercial well at 830-35 feet after setting 8-inch with show for second string at 756 feet but passed it up and was drilling in black shale at 1,013 feet after passing through anhydrite topped at 958 feet. Mamie McCurry's No. 1 Rowland, SW SW Section 9-19-11, Union County, was drilling shale in the red beds at 3,020 feet.

Quiet on Texas Border

East Texas, border counties, remained inactive except for General Minerals Co.'s No. 1 Foster & Billingsley, in the J. Bowlin Survey of Shelby County. Abandoned last November as a dry hole at 2,895 feet, it has been revived, drilled to 3,424 feet and again shut down, without a show. Location is 6 miles northeast of Timpson.

Canada

(Continued from Page 120)

drilling has indicated considerable faulting and the probability that the Madison lime is very deeply buried, though some higher potential oil horizons are likely within reach of the drill. Sentinel Oils, Ltd., was organized originally by Calgary interests, with J. F. M. Moodie as president and managing director. The hole is reported in good shape for a thorough deep test.

Tests in the Foothills

In the old Oil City Field, southwestern Alberta, Oil City Royalties' No. 1, Section 30-1-30w4, is drilling below 310 feet in exceptionally hard formation.

In the Moose Mountain area efforts are being made to complete Graystone Petroleum Consolidated's No. 2 Signal Hill, LSD 9, Section 34-23-5w5. This test has been drilled to 4,224 feet. A good show of high grade crude was secured in a sand above the Dalhousie but the hole was too small to take production.

Athabaska Operations

A recent official report on Athadome Oils' No. 2, LSD 3, Section 15-66-23w4, in the Athabaska district of northern Alberta, shows that the oil reported struck at 1,650 feet was a heavy asphaltic base product of approximately 12.1 gravity reported free from sulphur. Geological samples indicate a 50-foot sand, though there was some water indicated in the lower 10 feet. Drilling was continued and salt water was struck at 1,770 feet. This is being shut off to deepen to 1,960 feet to a possible lower oil horizon. The well is reported making around 15 bbls. a day while drilling.

Twin River Test

In the Alberta border area, the joint test of Nordon Corp. and C. A. Roney on the Twin River structure, LSD 11, Section 2-2-20w4, has cemented 8⅝-inch casing at 3,777 feet, approximately 70 feet in the Ellis formation. It is logging around 20 or 25 feet higher than Parco Oil Co.'s No. 1 Twin River, about three-

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Tulsa, Oklahoma.

fifths of a mile south and west, which got a crude oil show in the top of the Madison, bailing around 6 bbls. a day of 31 gravity crude with no water. In deepening water was struck. The well was plugged back and shot but did not increase the production. Arthur I. Davis and S. Myron Sandmer, petroleum engineers, of Los Angeles, Calif., visited the well recently; and Frank R. Henry and Glen M. Ruby, president of Nordon Corp., will come from Los Angeles to see the new test completed.

Acreage Deal Not Confirmed

Unofficial reports of a deal whereby Imperial Oil, Ltd., would take over and test acreage of the Calgary & Edmonton Corp. in the new South Turner Valley area are not confirmed by Calgary officials of the companies. A recent statement from Imperial Oil, Ltd., at Toronto is that the company does not at present contemplate any drilling in any part of Canada this year.

Wainwright Field

In the Wainwright Field, East Central Alberta, Bethwain Oils' No. 1, LSD 13, Section 6-45-6w4, has been cleaned out and placed on the pump. The well was finished some years ago at 2,485 feet, with production of asphaltic crude from three sands between 2,063 and 2,362 feet, but has been shut off production for some time. It is possible further drilling may be undertaken this season by the Bethwain company, which holds considerable acreage in the Wainwright Field.

Canadians In Cut Bank

Commonwealth Petroleum, Ltd., of Calgary, jointly interested with W. M. Fulton in Commonwealth-Fulton's No. 1, NW Section 16-34-6w, is reported drilling below 2,700 feet and will set pipe shortly. Pay is looked for between 2,900 and 3,000 feet.

Alberta Pacific Consolidated Oils, Ltd., of Calgary, has definitely completed its No. 1 Kiesel, NE NW Section 11-34-6w, pumping about 70 bbls. a day. Alberta Pacific's No. 2 Matson, SE NE SW Section 14-34-6w, is drilling below 2,670 feet, and should be an early completion.

Another test of interest to Canadian operators is Par Oil Co.'s No. 1 Haines, SE SE Section 2-34-6w, one of the first to get an oil show in the Stewart sand, and drilled originally by the Breckon & Hatch Oil Co. R. H. Breckon of Calgary, one of the organizers, is now interested in prospective development in the Unity Valley area of Saskatchewan. Par Oil Co. which recently took over the well has deepened it into the Darling sands, bottoming at 2,830 feet, and it looks like a better than average producer.

British Columbia Test

In the Flathead Valley, southeastern British Columbia, Columbia Oils, Ltd., of Vancouver, has started work on its No. 1 test on the Sage Creek Dome. Standard tools will be used for the first 700 feet, and the deeper drilling done with specially designed diamond drill equipment.

Location of No. 1 was selected after an exhaustive examination of the Sage and Kishinena Creek structures last season by Dr. Victor Dolmage, consulting geologist. Operations will be conducted under the supervision of George W. Brake, general manager of the company, and F. M. McMahon, field superintendent. Samples of seepage oil from this area indicate possibilities of a light crude or crude naphtha production similar to that of Turner Valley. Geological information indicates production is likely at from 4,000 to 4,500 feet. A test previouly drilled by Crow's Nest-Glacier Oil Co. on the same structure failed to reach this depth, though it was carried to 3,260 feet with encouraging indications of high grade crude.

Drilling in Ontario

In the Dover Field, Kent County, Ontario, Raleigh Development Syndicate's No. 1 Stevens farm, Lot 2, front concession, Dover Township, is standing at 2,885 feet waiting for casing, after getting the top of the Trenton limestone at 2,880 feet, somewhat lower than the Trenton in the nearby Ajax Oil & Gas Co.'s No. 4, which finished as a large gasser in the Trenton.

In Essex County, Bon Jasperson's No. 1, Lot 14, Concession 2, Maidstone Township, is at 225 feet and is reaming down.

In the Raleigh Field, Kent County, during a recent electric storm Olga Oil & Gas Co.'s No. 4 gasser was struck by lightning which melted the metal fittings and ignited the gas. The well was again capped inside a few hours.

Road Allowance Drilling

The possibility of drilling tests on road allowances in the Turner Valley district is being considered by a syndicate represented by Norman M. Plummer of Calgary. Drilling is subject to permission from the provincial government.

Gulf Coast Fields

(Continued from Page 112)

County, experienced its first blowout in W. L. Pearson's No. 1 Wilson Heard, which in the shallow gas sand at 2,221 feet got away from the operators, cratered and caught fire, resulting in loss of derrick, rig and engines. Late in the week it still was out of control. It is approximately a half mile east of the discovery well.

This blowout is expected to have an important place in the testimony to be presented the railroad commission at a hearing in Corpus Christi, Wednesday, by operators seeking to have drilling restrictions placed upon the area. Following completion of the discovery well, Greta Oil Co.'s No. 1 O'Brien, several weeks ago, a program of close drilling and line fighting started. Although there are few tracts smaller than 25 acres, initial locations have been made in the corners of these tracts, necessitating numerous offsets. The fact that the Missouri Pacific right of way cuts through the numerous small tracts has increased the problem of close well drilling.

The Pearson blowout, although some distance from the main development at this time, has emphasized the hazard of high gas pressures characteristic of development throughout Refugio County and other counties in the lower Gulf Coast district and dangers of blowouts which would prove disastrous in closely drilled areas. That such a blowout might occur along the railroad right of way and the main paved highway adjoining it is possible and might result in material loss of property, not only to the operators and leaseholders but also to the railroad and county.

May Be Major Field

The Greta area has given indication of assuming major proportions. So far only the discovery well has been completed, which blew in May 19 from a sand at 4,396-4,403 feet in the Heterostegina zone of the Marine Oligocene, making an estimated 500 bbls. of 21.5 gravity oil. The oil is of exceptionally high lubricating value, comparable to the crude from the 3,700-foot sand at Refugio and a premium is being paid for it over the posted prices. It is being moved by tank car to Corpus Christi for shipment although two pipe line companies have offered to lay lines to the area. Two other tests, E. H. Buckner's No. 1 O'Brien, southwest of the discovery well, and M. C. McGeehee's No. 1 O'Brien, 2,300 feet northwest of the discovery well, are within a few hundred feet of the sand and shortly should throw some additional light in the importance of the producing horizon. Three other tests are drilling while more than a dozen locations have been made.

An idea of what may be expected in size of the field is given by a correlation of a 2,200-foot gas sand which has been encountered uniformly by all tests so far. In the discovery well, this sand was encountered at 2,215 feet; in the McGeehee well, 2,300 feet northwest, it was at 2,218 feet, and in the Pearson well, a similar distance east, it was at 2,215 feet. Judging by these depths, the sand is a blanket sand extending over a wide area. In the Refugio Field, 9 miles south, there is a blanket gas sand at 2,400 feet, the only such sand extending over that field, and it is believed the 2,200-foot sand at Greta is the same sand as that one. If it is, the Greta structure is materially higher than Refugio and should prove of considerably greater importance.

Operators seeking drilling restrictions at Greta are seeking to forestall a repetition of what took place at Refugio, where an intensive and close drilling townlot development virtually ruined the field by greatly curtailing the life and recovery of the field and resulting in rapid encroachment of water. Although a field covering a wide structural area having numerous sands of great potential value, Refugio, opened in 1928, now is about through. Water has taken nearly all the wells and production which reached a peak of around 60,000 bbls. daily now is down between 6,000 and 7,000 bbls. daily.

Location of wells in the centers of the small 25-acre tracts at Greta would permit adequate drainage, it is claimed, and at the same time prevent the excessive drilling in corner offsets and lessen the hazards which would result from blowouts. The railroad commission also is to consider the advisability of requiring the cementing of approximately 1,200 feet of surface casing in each well to shut off the upper water sands.

Kansas Fields

(Continued from Page 107)

No. 2 Froese, NW cor. SW NW Section 20-22-3w, made 712 bbls. from 3,472-94 feet.

Kingman County

Skelly Oil Co.'s No. 1 S. Miles, CNL N half SE Section 30-27-10w, is a rig.

McPherson County

Helmerich & Payne's No. 2 Russell, SE cor. NW NW NE Section 23-19-2w, made 20,000 feet of gas from 650-64 feet. Johnson and others' No. 2 Shaw, SW cor. Section 21-19-1w, made 24,500,000 feet of gas from 2,940-61 feet.

Reno County

Olson Oil Co. and others' No. 1 Hutchinson Lumber Co., C NE NE Section 23-23-4w, made 170 bbls. from 3,275-3,377 feet.

Woodson County

C. Sheedy's No. 1 Mills, SE cor. NE Section 24-25-13, is a rig. F. Fields' No. 1 Munson, SW cor. NE SW Section 9-25-14, was drilling at 500 feet. Harper & Dicks' No. 4 Figger, SE cor. NW Section 28-23-14, was drilling at 400 feet. Ward McGinnis' No. 1 Ross, NW cor. SE Section 32-25-14, was abandoned at 1,520 feet. H. Allen's No. 1 Irwin, NW cor. NE NW Section 30-25-14, was abandoned at 1,524 feet.

TAX ON OIL ROYALTIES

CHATHAM, Ontario, June 17.—The right of the Canadian federal government to impose income tax on royalties from oil lands in the Turner Valley Field will be finally disposed of in a case to be argued shortly before the Privy Council at London, England. The Exchequer Court of Canada in September, 1930, ruled royalties were taxable; but the Supreme Court of Canada in 1931 reversed this ruling, holding the royalty was a return of capital and not an income and not liable for income tax. The Minister of National Revenue has now appealed the case to the Privy Council, the court of last resort. If royalties from the sale of oil lands are found liable to income tax, scores of individuals and corporations operating in the Turner Valley Field will be affected.

TEXAS PIPE LINE HEARING

AUSTIN, Tex., June 19.—The oil pipe line hearing scheduled to have been held by the Railroad Commission starting June 15 has been postponed until June 26, at the request of interested parties on both sides.

TECHNICAL QUESTIONS ANSWERED

By Charles K. Francis, Ph. D., Technical Editor

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to Dr. C. K. Francis, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in the various phases of plant operation; also those connected with marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible.

Inquiries must be signed but only the given initials will be printed. The source of the questions is considered to be confidential.

Questions requiring a dicussion of patents, the use of intricate formulas, extended computations, or cost estimates cannot be considered.

When the matter is of general interest the reply will be published within a reasonable time.

Research Method and the Motor Method for Knock Tests

It will be appreciated if you will kindly explain the difference between the research method and the motor method for making knock tests on gasoline.—D. S. E.

For some years numerous investigators have been making a study of the details of the method for determining the knock rating of motor fuels. The single cylinder engine, with a bouncing pin indicator, which was run under fixed conditions, has been accepted in the United States for test purposes. An intensive investigation of the engine and the conditions for making the test was made by the Co-operative Fuel Research Committee, the membership of which included representatives of the U. S. Bureau of Standards, the American Petroleum Institute, Society of Automotive Engineers, and the National Automobile Chamber of Commerce. The original engine was designed by the General Motors Corp. and improved by the Ethyl Gasoline Corp. This was further modified by the committee and became known as the C.F.R. engine. The recommended procedure required no preheating of the air-fuel mixture, the speed was set at 600 r.p.m. and the jacket temperature was 212° F., under a fixed compression ratio of 7.75 to 1 and other conditions of engine adjustment. (See The Oil and Gas Journal, April 30, 1931, page 22.)

The C.F.R. committee found that in many instances there were differences between the laboratory results and actual road tests too large to be explained as the experimental error. This caused a special investigation to be made under road conditions in which 15 cars were operated for two weeks, making use of 15 different fuels. All results obtained represent the findings of at least two groups of observers, usually three men to the group. More than 2,500 runs were made up a long and difficult hill, known as the Uniontown Hill, Pennsylvania, and approximately 10,000 observations of knock conditions were recorded. A study of the data revealed that definite changes in equipment and procedure were necessary to obtain satisfactory correlation between laboratory findings and road ratings. The final conditions include:

1. Speed, 900 r.p.m.

2. Mixture temperature, 300° F.; heat applied by an electric heating unit placed between the carburetor and the intake port; the mixture temperature to be measured by a mercury thermometer whose bulb is placed in the center of the mixture stream entering the inlet port.

3. Spark timing, 26 degrees before top center at 5:1 and following the present timing mechanism at other compression ratios.

4. Shrouded intake valve.

5. An improved type of steam condenser and elimination of the circulating pump.

6. Throttle setting of 90°.

Further in making the specified changes in equipment it is absolutely necessary that every new part of the equipment, including the complete electric heater, thermometer, shrouded intake valve, and condenser and water connection to replace the circulating pump, should be specifically those manufactured for this purpose by the Waukesha Motor Co.

Acting upon the report of the operating group and the recommendation of the detonation subcommittee, the co-operative fuel-research steering committee, at its meeting on September 12, 1932, officially approved this modification of the knock-testing procedure, to be known thenceforth as the C.F.R. Motor method.

The steering committee also approved the suggestion of the detonation subcommittee that the C.F.R. method should not be discarded, since it is one on which considerable experience and data have been obtained and undoubtedly has value from the experimental standpoint, but should be retained under the title, C.F.R. Research Method.

March 7, 1933, the American Society for Testing Materials, through its Committee D-2, adopted the C.F.R. method as a tentative standard under the title Method of Test for Knock Characteristics of Motor Fuels. A description of the test may be obtained for 25 cents from the society at Philadelphia, Pa.

Principles of Revivification of the Spent Doctor Solution

I am interested in the recovery of spent doctor solution from the treatment of high sulphur gasoline. Could you tell me where I could obtain information, such as: general outline of the steps involved, method of oxidizing lead sulphide to litharge, and percentage recovery?—D. H. M.

The recovery of spent doctor solution does not include the restoration of the chemicals to the original condition. It is simply a process whereby the solution is revivified to the condition that it will again function for sweetening. The essential reactions involve the conversion of the black precipitate, lead sulphide, to lead sulphate which is finally converted to sodium plumbite. Sodium plumbite is the active constituent of the doctor solution so it is not necessary to carry the recovery process to the litharge stage. There is always some caustic soda remaining in the spent doctor solution and it is this which helps to form the plumbite although some operators find it advisable to add caustic soda during the revivification operation.

The details of the methods for the revivification of doctor sludge may vary in different plants but the essential principles are the same. The greater part of both caustic soda and lead may be recovered; the sodium hydroxide tends to form sodium thiosulphate and finally sodium sulphate so that a proportionate loss of the sodium takes place. The lead recovery is high, approaching 100 per cent.

The conventional practice is to run the spent doctor solution to storage, a series of tanks being provided for this purpose, where there is a separation of oil from the heavy material. This heavy black precipitate is pumped to the recovery unit. The first operation is to bring the temperature to about 125° to 150° F. for the final separation of any entrained oil and to bring the mixture to a suitable condition for the blowing stage. The blowing tanks are equipped with open steam coils and perforated pipes through which compressed air is supplied. The temperature is kept below the boiling point and the blowing with air continued until the batch is finished; that is when a clear yellowish to brown solution is obtained. This solution is tested for lead content and alkalinity, then brought to the standard strength by the addition of fresh caustic solution. It is essential that there shall be enough sodium present during the blowing to unite with the lead, any deficiency being corrected by adding caustic soda.

When the solution has been adjusted to the desired density and equivalent lead content it is ready for use.

Further details may be found in the listed articles: Lead Sulpide Treating in Refining, by G. L. Rowsey and J. F. Whitehurst, The Oil and Gas Journal, December 27, 1927, page 250; Went and Diggs, Ind. Eng. Chem., Vol. 16, page 1,114, 1924; Morrell and Faragher, Ind. Eng. Chem., Vol. 19, page 1,045, 1927; Mercaptans in Treating Gasoline, by G. W. Ayers, Jr., The Oil and Gas Journal, October 3, 1929, page 201; Recover 17,000 Pounds Litharge Daily, by W. T. Ziegenhain, The Oil and Gas Journal, September 18, 1930, page 46.

Various Specialty Oils Prepared by Proper Blending

I would like to know how the high grade lubricants, fine watch oils, etc., are prepared and hope you can give me some information.—G. T. I.

There are approximately 100 refineries in the United States manufacturing lubricating oils. Possibly half of these are equipped with facilities for making any kind of lubricating oil that may be produced from petroleum. (See The Oil and Gas Journal, March 30, 1933, page 41). The most important characteristic of the mineral lubricating oils is viscosity, which may vary from about 50 seconds Saybolt Universal to over 2,000 at 100° F. By proper blending it is possible to make an oil of any desired viscosity within this range.

There is a limited market for some lubricating oils, called specialties, so these are made by only a few plants. Watch and clock oils are not sold in large volume; in fact, they probably represent the lowest market requirement of all classes of lubricating oils. Certain animal and plant oils are in demand as lubricants for special purposes, such as watches and instruments. All oils of this type are especially refined, because they must not oxidize after long use and are required to be well adapted to changes in temperature in addition to being free from corrosive compounds. Olive oil, neats-foot and sperm, after very complete treating to stabilize them, are used as watch oils. The viscosity ranges from 100 to 200 seconds Saybolt Universal at 100° F.

The finest grades of petroleum lubricating oils are known as white oils. These are made by complicated treating methods, requiring concentrated sulphuric acid, liquid sulphur dioxide, ammonia, alcohol and filtration through the fine grade of fuller's earth. White oil is recommended for lubricating delicate instruments and light machinery. Watch oils may be prepared from this oil.

Quantity of Salt Permitted in Crude Petroleum

What is the percentage of salt contained in the normal crude oil? When purchasing large quantities of oil to be run to the refineries is it customary to inspect such oil for salt? What would be a reasonable specification for salt in such oil?—J. C. Y.

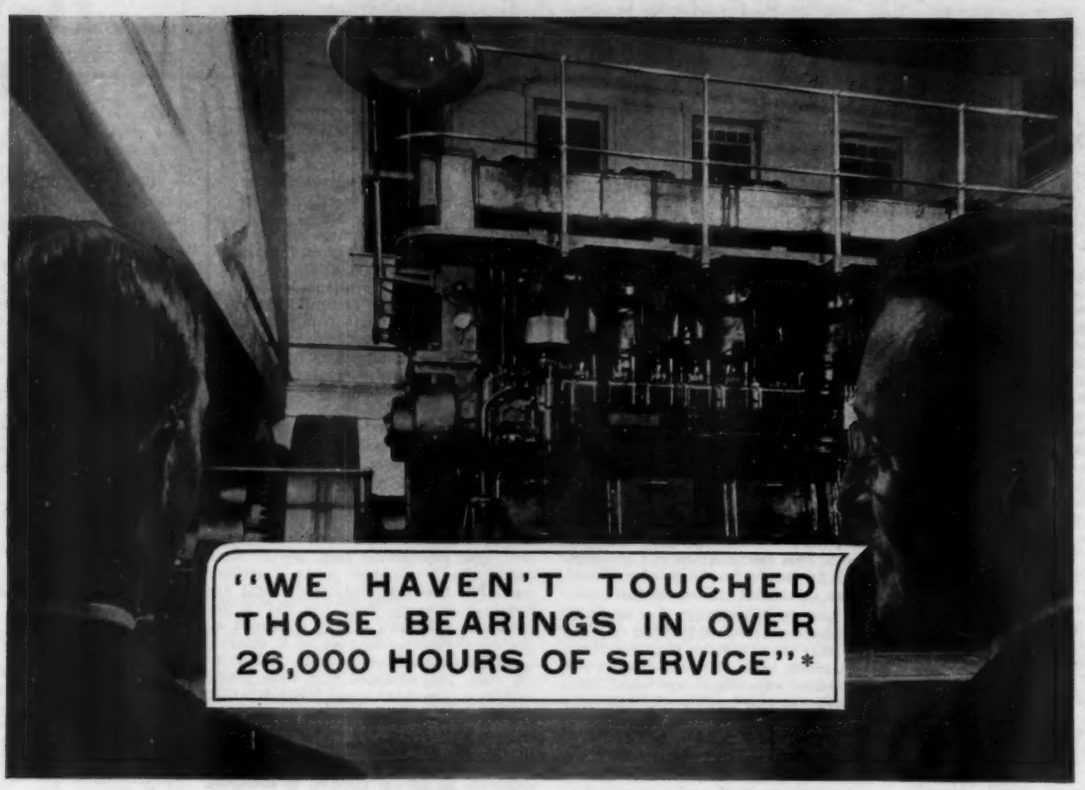
The inspection of crude oil by the agents of the major purchasers is in most cases confined to gravity and water and sediment. The gravity determination is necessary because the price tables are arranged on this basis. The common practice is to require that water and sediment shall not exceed one-half of 1 per cent by volume. This specification will take care of the salt content except when unusual quantities are present.

Salt, sodium chloride, is not soluble in dry oil but is present in oil containing small quantities of water. Oil well waters may contain as much as 25 to 30 per cent salt, so the pipe line specification of 0.5 per cent sediment and water would permit 0.125 per cent salt to be present when the water showed a 25 per cent salt content. This quantity of salt would be a serious matter for the refiner, as it would be equivalent to approximately 300 pounds per 1,000 bbls., so when an exceptional oil is tendered, say an oil containing enough water to carry high quantities of salt, an additional specification to control this is applied.

The limitations for salt are in most cases set on the basis of pounds per 1,000 bbls. Several refiners who have established a salt specification for crude oil deliveries, report from a minimum of 5 pounds per 1,000 bbls. to 30 pounds.

This special quality requirement is important with respect to emulsified oils that have been treated and to the oil recovered by the treatment of tank bottoms.

It should be noted that salt reported in the analyses of crude oils is by calculation from the chlorides found, and therefore includes other chlorides, such as magnesium and calcium, which are probably more objectionable to the refiner than sodium chloride, because they more readily produce the corrosive hydrochloric acid in the stills.



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- √ 2. Low Lubricating Oil Consumption
- √ 3. Quietness—absence of vibration
- √ 4. Simplicity of Design
- √ 5. Rugged Construction
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"—and that De La Vergne Diesel Engine is practically in continuous operation." It's natural for De La Vergne engine owners to brag about the service they get from the "quietest, smoothest-running Diesel engines ever built."

For they are getting the real proof of the superiority of these engines in profitable, trouble-free operation year in and year out.

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Maintenance economy has been *BUILT INTO* every one of these engines.

For instance, records on Types VA and VB engines show there has never been a crankshaft failure, no crankpin bolt failures, not a single cylinder head failure where correctly designed cooling systems have been provided, no camshaft drive failures, and bearing replacement is so exceptional that it is practically unknown.

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*Name of installation on request.

NATURAL GAS DEVELOPMENTS

Illinois Orders Change in Panhandle Contract

CHICAGO, June 19.—The Illinois Commerce Commission disapproved the contracts between the Panhandle-Illinois Pipe Line Co. and Illinois gas distributors for the delivery of gas from the Texas Panhandle.

The commission ordered the pipe line company to file new contracts within 30 days. The utilities affected are the Illinois Power Co., Illinois Power & Light Corp., Central Illinois Light Co. and Central Illinois Public Service Co.

The commission cited several features of the contracts. One required the distributors to pay the Panhandle-Illinois Pipe Line Co. on a minimum basis of 150 feet daily for each customer, or a total of 3,000,000 feet. The commission felt this requirement was excessive and might operate to force higher consumer rates.

The commission condemned a provision which excluded municipal and other utility companies serving the same territory as the contracting distributors from obtaining natural gas. This was held to grant monopolies to the contracting parties.

Another clause stated that existing artificial gas plants should be retained as "stand-by" plants in event of a shortage of the natural product. The commission pointed out that the natural gas companies have claimed a virtually inexhaustible supply and saw no reason for the "stand-by" agreement.

The contract with the Illinois Power & Light Co. contained a provision for an arbitration board to settle rate disputes between the pipe line and distributing companies. The commission said utilities had no right to govern their own controversies and that the commission itself retained jurisdiction over rates.

Southern California Gas Rates Reduced $1,000,000

LOS ANGELES, Calif., June 19.—Gas rates of Southern California Gas have been reduced by approximately $1,000,000 annually in an order of the State Railroad Commission.

The order, effective as of June 1, followed the offer of the company for a reduction of that amount after the company had obtained a temporary restraining order from the Federal Court enjoining an interim reduction of $500,000 annually ordered last November.

The new order provides the company shall refund to consumers some $375,000, representing the difference between the amounts collected since last December 1 and the rates ordered in the interim order.

The commission's decision commends to other public utility executives "the social vision and practical wisdom displayed" by A. B. McBeth, president of Southern California Gas Co.

Members of the commission estimated the new rates would represent a return of about 6½ per cent to the company as compared with 7 per cent or greater which utilities in the state generally have been allowed.

The Los Angeles metropolitan district will get the major portion of the reduction.

ST. LOUIS ASKS REDUCTION

JEFFERSON CITY, Mo., June 17.—The demand of the city of St. Louis that the gas rates charged by the Laclede Gas Light Co. for gas be reduced 5 per cent formally is being laid before the Public Service Commission.

Michigan Natural Gas Corp. Announces Plans for 157 Mile Natural Gas Line

MOUNT PLEASANT, Mich., June 17. President A. Sarkisson, of the Michigan Natural Gas Corp., says a survey for a natural gas line from the Central Michigan Field to Saginaw, Bay City, Flint and Pontiac has been authorized by the company and construction of the 157 miles is expected to be under way within 30 days. A plant to utilize casinghead gas in the Chippewa-Greendale oil pool and the new Porter Pool will be constructed.

The Michigan Natural Gas Corp. already has been granted permission by the State Public Utilities Commission to construct a main from the Central Michigan Field to Saginaw and Bay City. A petition was filed with the commission to include Flint and Pontiac.

Mr. Sarkisson said the company had based its request for the inclusion of Flint and Pontiac on the recent developments in Central Michigan which have shown up added reserves.

Mr. Sarkisson said William F. Brown, Mount Pleasant engineer and geologist, had been authorized to proceed with a survey of the pipe line route. The gas main will leave the field a 12-inch line. It is planned to extend an 8-inch main to Saginaw and Bay City. The line will be of steel-welded construction.

As added reserves are built up, President Sarkisson said, the company will extend its pipe line system to the numerous cities and industries awaiting natural gas. He predicted that the pipe line would result in a wide exploration program throughout the State. Drilling, long at a standstill as far as gas is concerned, is certain to be spurred as soon as a pipe line is constructed opening up markets.

Arrangements made with the Pure Oil Co. some time ago by the company call for a $200,000 testing program, it was said. The recent discoveries of oil in Porter Township with added volumes of casinghead gas and the dry gas strike in Mecosta County, indicating a new gas pool, are the most recent developments in new reserves in Michigan. It is on the basis of these showings that the company included Flint and Pontiac in the pipe line permit. Showings of gas also have been made in Ogemaw County, Clare County (outside the present developed pool) and several other areas of the State.

15,000,000-Foot Gas Well in South Indiana

PRINCETON, Ind., June 17.—What is said to be next to the largest gas well ever drilled in southern Indiana is the Knox Engineering Co.'s No. 2 Penndiana Trust, on the G. C. Sampler farm in the Francisco gas field, east of here, in the past week.

At 1 foot in the sand the well gauged 10,300,000 feet per day and the volume of gas increased as the well drilled itself in. It is estimated as a 15,000,000-foot producer. The well will be connected to the high pressure line of the Kentucky Natural Gas Co.

Besides the officials of the Knox Engineering Corp., J. E. Bauer, president, a number of natural gas operators were present when the well was drilled in, including: Richard Steinhorst, president of the Tioga Gas Co., Emporium, Pa., and M. J. Dewey, engineer; Ralph Eseray, assistant state geologist of Indiana and S. M. Newton, former president of the Indiana Southwestern Gas Corp., who associated with Mr. Bauer first brought gas to southern Indiana.

SELL GAS INTEREST

Robert Lewis, president, and P. J. Minck, secretary-treasurer, of the Eastern Shore Gas Co., have sold their interest in the company to William H. Wulf and L. D. Pierson, both of New York. The company operates propane distributing systems in Maryland, Virginia and Delaware. Mr. Minck is a former Tulsan.

NATURAL GAS LINE

CHATHAM, Ontario, June 17.—Olga Oil & Gas Co. of Toronto has entered into a five-year contract with the Southern Ontario Gas Co. to take production of its wells in Raleigh Township, Kent County. Some 4 miles of 4-inch pipe has been ordered for the line which will be laid this summer by the Southern Ontario Gas Co. to connect with its main transmission line. It is understood the Olga company will receive 25 cents per 1,000 feet.

Northwest Pennsylvania Industrial Rate Reduced

HARRISBURG, Pa., June 19.—Industrial gas consumers in Erie and Warren Counties served by the Pennsylvania Gas Co. will pay less for gas after July 10.

The company filed with the Public Service Commission a supplement to its tariff schedule providing these rates for industrial gas consumption:

For consumption of 2,000,000 feet or more a month, first 10,000 feet 78 cents per 1,000 feet, 68 cents per 1,000 feet for next 990,000 feet, 63 cents per 1,000 feet for next 2,000,000 feet and 85 cents per 1,000 feet for all over 3,000,000 feet per month.

For consumption of less than 2,000,000 feet but more than 1,000,000 feet per month, 78 cents per 1,000 feet for first 10,000 feet, 73 cents per 1,000 feet for all over 10,000 feet.

For consumption of less than 1,000,000 feet, 78 cents per 1,000 feet per month.

CANADIAN GAS PRODUCTION

CHATHAM, Ontario, June 17.—Official figures show that natural gas production from all Canadian fields in April, 1933, amounted to 2,222,556,000 feet, compared with 2,497,762,000 feet in March and 2,353,619,000 feet in April, 1932. Production for the four months ending April 30 was 10,492,765,000 feet, as against 11,627,437,000 feet in the same period of 1932. Imports of mixed natural and artificial gas in April were 6,842,000 feet, worth $5,189, compared with March imports of 7,713,000 feet, worth $6,153.

GAS FOR POTASH COMPANY

MIDLAND, Tex., June 19.—Gas from the Phillips Petroleum Co. wells in Lea County, New Mexico, will be used to operate potash mining machinery and the refinery of the United States Potash Co. Phillips company has made an agreement to supply the potash company for a minimum of 10 years. Pipe line laying is scheduled to start at an early date.

Gas Wells on Front Lawns and Back Yards in Paola

On front lawns, in back yards and on vacant lots, 30 producing gas wells have been drilled within the city limits of Paola, Miami County, Kansas, in the last two years. The pipes, valves and meters scarcely add to the beauty of the landscape, but, says the Kansas City Star, a $30 to $40 a month check and free gas for the house make the sight of the ugly gas equipment more than bearable.

Back in the days when Paola enjoyed a hectic but short-lived oil boom, drillers and speculators talked in terms of thousands. Now a gas well which brings in from $800 to $1,200 a year is a handsome stroke of fortune.

Since this shale gas is found at 475 to 500 feet, the approximately cost is only about $800 to drill such a well. The well should pay for itself in a year's time. Comparatively small cost of drilling has allowed local capital to finance these ventures. In most cases, four or five Paola men have advanced the money for each project, while the owner of the lot receives a one-eighth interest for his lease.

The chance of striking gas in this small field has been 10 to 1 for success. Of the 33 wells put down all over the town, only three have failed to produce. The 30 good wells send out an average of 8,000,000 feet of gas a month, which results in a monthly pay check of approximately $1,500 for the owners. During the summer months the local gas company, which buys the output, can take only about one-fifth as much as in winter.

Although the wells are said to be rather short-lived, the pressure seldom diminishes very much for a year or two. There is one well owned by Ernest Kelly, which was drilled more than 25 years ago and still is producing.

What is said to be one of the best of the shale gas wells in the vicinity is in the back yard of Dr. W. M. Dicke's home. Scarcely 15 feet from the rear of the house, between a garage and a building on an adjoining lot, the cramped space barely allowed the drill rig to operate when the well was put down. From 200,000 to 500,000 feet are drawn from the well each month.

Two of the most successful wells are on lots owned by T. J. Cummings, police judge and justice of the peace, and Paul Russell, former mayor.

Gas wells, however, are not the only kind which have been drilled in the back yards of homes in Paola. Two oil wells put down several years ago still produce an average of 25 bbls. a day between them.

It is not likely that many more gas wells will be drilled, according to Paola gas men. The area is said to be burdened with about as many wells as the field can supply. Any more drilling would only weaken all of the wells, it is said.

Gas Line to Minneapolis Again Being Discussed

The Minneapolis Journal revives the proposal to bring in a supply of natural gas, either from Texas or from Montana. At present the Northern Natural Gas Corp.'s line from the Texas Panhandle is extended as far as Owatonna, Minn., only 80 miles from Minneapolis. The line of the Montana-Dakota Power Co. from the Baker-Glendive Field in eastern Montana has been laid as far as Bismark, N. Dak. Either line could be extended to the Twin Cities. The Property Owners Association of Minneapolis favors the Montana gas, believing it can be obtained for about 20 cents per 1,000 feet.

PERSONAL PARAGRAPHS

Art O. Olson and M. A. Robinson, of Tulsa, visited in Casper, Wyo., last week.

* * *

George D. Foster, secretary of the Devonian Oil Company, Tulsa, was in Houston, Tex., the past week.

* * *

Capt. Al Williams, noted flyer, has been appointed manager of aviation sales for Gulf Refining Company.

* * *

Paul Hunter, of the geological staff of the Shell Petroleum Corporation, Houston, Tex., and family, spent a few days in Fort Worth last week.

* * *

Vernon Clifford Scott, paleontologist for the Texas Company, has been transferred by the company from Denver, Colo., to Shawnee, Okla., where he will make his headquarters.

* * *

G. C. McSwain, assistant superintendent of the Texas Company's refinery at Amarillo, Tex., is spending a vacation with friends at Bryan, and relatives at Port Arthur, Tex.

* * *

J. A. de Lancy, purchasing agent of the Asiatic Petroleum Corporation, New York, sailed for Europe recently for an extended visit. He is expecting to return in September.

* * *

William C. Morgan, Mid-Continent manager for Hughes Tool Company, is slowly recovering from very serious injuries he received a week ago in an automobile accident near Perry, Okla.

* * *

Mrs. A. S. Bailey, her son and daughter, have arrived in Casper, Wyo., to spend the summer at their cottage at Brookside. Mr. Bailey will join them later. He is an official of the Texas Company at Houston, Tex.

* * *

James Wallace, of the Richfield Oil Company, and R. Paul Huggins of the Western Gulf Oil Company, were recently elected president and first vice president, respectively, of the Los Angeles Petroleum Accountants Society.

* * *

Lee R. Saunders, formerly president of Petroleum Products, Inc., Kansas City, Mo., has opened an office under the name Saunders Petroleum Company. The firm will deal exclusively in wholesale tank car sale of petroleum products.

* * *

L. N. Julien, local branch manager in Tulsa for the Gardner-Denver Company of Oklahoma, is being transferred to Dallas, Tex. He will be succeeded in Tulsa by Walter Arns who has been connected with the company's factory at Quincy, Ill.

* * *

Mr. and Mrs. Oliver Forbes, of the Island of Aruba, Dutch West Indies, visited with friends in Casper, Wyo., recently before returning to their home where Mr. Forbes will resume his work with the Pan American Petroleum & Transport Company.

* * *

R. H. Lynn, head of the Panhandle land department of the Phillips Petroleum Company since 1926, has been elected a vice president of the company and will be transferred to Bartlesville, Okla., where he will have charge of the general land department. Mr. Lynn, a graduate of the University of Kansas, began his connection with the oil industry as a geologist 12 years ago.

* * *

C. O. Stillman, president of Imperial Oil, Ltd., has stated that his resignation of that position will be discussed at the postponed annual meeting of the company to be held at Sarnia on July 30. Mr. Stillman has been president of the company for some 15 years, succeeding the late W. J. Hanna. It is understood adoption by the Imperial company of the new superannuation policy of Standard Oil Company of New Jersey will also be under consideration.

E. R. Elledge, geologist of the Phillips Petroleum Company, has been assigned to the Chickasha, Okla., territory.

* * *

E. R. Filley, division manager of the Texas Company, and J. K. McGoldrick, vice president of the Texas Pipe Line Company of Oklahoma, were visiting in Kansas last week.

* * *

Ralph D. Risser, engineer, former Tulsan, has become assistant to G. R. Henson, production manager of the Gulf Coast division of Shell Petroleum Corporation, also formerly of Tulsa.

* * *

Mr. and Mrs. C. W. Brock, of Oklahoma City, Okla., became the parents of a 7½-pound boy, Charles Eugene, June 13. Mr. Brock is scout for the Texas Company at Oklahoma City.

* * *

F. E. Hatfield, superintendent for the Gulf Production Company in the Borger, Tex., district; H. D. Schmalhorst, chief clerk, Borger district and R. B. Saxe, superintendent, Pampa district, with their families, compose a party motoring to Chicago for the World's Fair.

Men of the Industry

A. E. HARNSBERGER

As mechanical engineer for the refinery control board of the Pure Oil Company, A. E. Harnsberger has general supervision of refinery maintenance. He joined the company in 1924 as assistant to the mechanical engineer in charge of maintenance of refineries. Four years later he was promoted to his present position, in which he has supervision also over the operation of refinery service units, such as the gas recovery systems, water works, power houses, refrigeration and repair shops. His work takes him too into pipe line and river transportation operation and maintenance.

Mr. Harnsberger was born in 1899 at Staunton, Va. He graduated in 1920 from the Virginia Polytechnic Institute in Blacksburg, Va. Upon leaving school he was employed by the Worthington Pump & Machinery Corporation, serving first as a plant and field test engineer and then in the engineering department on design and development of various types of pumping machinery. He left Worthington to join the Pure company. His home is in Winnetka, Ill.

C. R. Barton, vice president, Tide Water Oil Company, has returned to Tulsa after an extended visit to New York.

* * *

E. W. Barr, of Tyler, Tex., is now deputy supervisor for conservation of the Texas Railroad Commission in the East Texas Field.

* * *

B. V. Wallis has been transferred from the Bower plant at Pampa, Tex., to the Texroy plant located in the Borger district, as superintendent.

* * *

L. P. Garrett, vice president of the Gulf Production Company, Houston, Tex., has left with his family for a vacation trip to be spent in touring Europe.

* * *

Dr. Theodore A. Link has resumed his duties with Imperial Oil, Ltd., at Calgary after six months spent in preparing the petroleum industry exhibit at the Chicago World's Fair.

* * *

John Farrell, independent operator of Fort Worth, Tex., and Mrs. Thelma Henley of the same city, were married June 17, leaving immediately for a honeymoon trip to New York City.

* * *

G. A. McGinsey, of Los Angeles, Calif., is visiting his daughter, Mrs. L. M. Kiplinger, in Casper, Wyo. Mr. Kiplinger is connected with the Ohio Oil Company interests in Casper.

* * *

Heinrich von Riedemann, European director for the Standard Oil Company (New Jersey), sailed from New York for Bremen last week, after a short visit at the New York headquarters of the company.

* * *

C. P. Widdicombe, representative for the Sivyer Steel Casting Company, Chicago and Milwaukee, is in Texas on a business trip. Mr. Widdicombe is building a home in San Antonio, where he will spend the winters.

* * *

W. E. Wrather, consulting geologist, Dallas, Tex., was the guest speaker at a special meeting of the Houston Geological Society, delivering an illustrated lecture on an expedition he made with a party of geologists to South Africa.

* * *

Miss Marie Dahlgren Foster, daughter of Mr. and Mrs. H. V. Foster, and John Miller Kane, son of Mr. and Mrs. John H. Kane all of Bartlesville, Okla., were united in marriage at the Foster country place near Bartlesville, on Thursday, June 15.

* * *

E. G. Allen, general superintendent of production, Shell Petroleum Corporation, Houston, Tex., has resigned to engage in business for himself. He will make his home in Dallas, Tex. G. R. Henson of the St. Louis office has moved to Houston to succeed Mr. Allen.

* * *

Frederick G. Clapp, who has been advising the imperial government of Persia in connection with the framing of a new oil concession with Anglo-Persian Oil Company to replace the old D'Arcy concession (which was cancelled), started on May 31 on a sight-seeing tour of Persia and Afganistan. He expects to return to Paris, France, by June 30 and to New York City by July 31.

* * *

C. R. Welch, for 4½ years manager of the land department in the Wichita, Kans., district for the Shell Petroleum Corporation, has been made assistant superintendent of the land department in the Mid-Continent area with offices at Tulsa. Mr. Welch has been with the Shell corporation for 10 years. Charles I. Warren, who was assistant to Mr. Welch at Wichita, has been promoted to manager of the land department in the Wichita district. Mr. Warren, previous to coming to Wichita three years ago, was in the Oklahoma City offices of the company.

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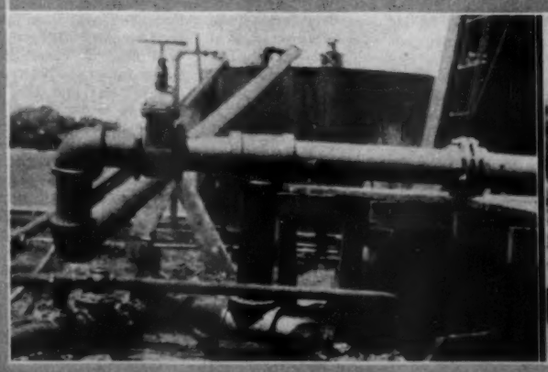

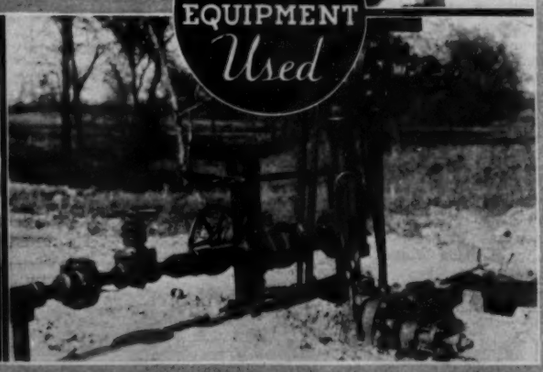

FIELD PROBLEMS FROM READERS

Edited by Thomas F. Smiley

This department is conducted in order that men connected with the drilling, producing or transporting branches of the petroleum industry may obtain aid in solving problems that confront them in their work. Readers are invited to send questions freely. These questions will be placed in the hands of persons capable of answering them authoritatively, and the answers, based on the best available information, will be published.

Each question should give as much detail as possible, especially if it involves depth of sands, types of sands and operations on adjoining or nearby properties. The source of questions will be considered confidential, and only the initials of the sender will be published. Questions involving patented processes, intricate formulas or estimates of cost cannot be answered. If an immediate answer is important, one will be given by mail when the writer requests it.

In this connection, The Oil and Gas Journal will be glad to publish articles from field men who have devised new methods or improved old ones.

Would Have Avoided Trouble if He Had Tested Water Shutoff

I will appreciate some information regarding a simple and efficient method of testing a water shutoff, for I am convinced that it is the best plan to make such tests before bringing in a well. There is a leak in a well that I completed several weeks ago and in which I supposed I had made a water shutoff. I don't know just where the leak is. I would have saved myself trouble if I had tested the shutoff before drilling in.—G. N. E.

The normal function of casing is to exclude water, gas or small showings of oil from a well and if the work has not been done in a proper manner most of the expense of the casing and the labor of running and cementing it will be lost. It is therefore essential that a thorough test be made on completion of a cementing job or other work designed to exclude water from a well.

If cement has been used, such a test should not be made until the cement has had time to set and harden properly. Any cement left within the casing should first be drilled out, and a hole drilled for a depth of 10 or 20 feet ahead of the shoe of the water string. The fluid then should be bailed down until the level is sufficiently below that at which the fluid stands outside of the casing to allow water to enter if it is able to do so. After bailing, the fluid level within the casing is carefully measured and recorded.

The well then is allowed to stand 24 hours and a second measurement of the fluid level within the casing is made. If the level has not been changed materially the shutoff is regarded as successful.

Draining of films of water down the inner walls of the casing after bailing may raise the fluid level slightly. Even though a slight leakage of water under the shoe is apparent, it may be considered too slight to justify further repair work.

Measurement of fluid level within a casing may be made with the aid of a heavy plumb bob and a steel measuring line, on a suitable reel mounted above the well mouth on the derrick floor. If cable tools are available it is customary to make fluid level measurements with the sand line and bailer.

If tests made as outlined above indicate that the effort to exclude water has not been successful, further tests must be made to determine the nature of the difficulty. Perhaps, owing to one or another of the physical and chemical variables in the cement, it has not set or if it has set open channels may have been left through it.

To locate the source of water entering a well tests should first be made to determine whether or not the casing leaks. Testing for casing leaks may be conveniently conducted with a casing tester which is alternately lowered to successively greater depths and hoisted to the surface until it brings up water. The casing may be worn through by abrasion of the tools or it may have split at a defective weld, or as a result of application of "n swage; or the leak may be at a loose collar which is cross-threaded or which has become unscrewed in the well.

If the leak is not in the casing a test next should be made to determine whether water is finding its way down through or around the cement plug and under the casing shoe or whether it comes from some lower source. For this purpose, a "bridge" should be placed a few feet below the shoe, sealing off the hole that has been drilled below the bottom of the casing. This plug is built up from the bottom in successive stages with the aid of wooden or lead plugs and cement. If further tests indicate that water has been excluded by this process, it may be concluded that the shutoff has been placed too high, and that water-bearing formations occur below the casing shoe.

The nature of the remedial measures to be taken depend upon the source of the water and the way in which it finds admission to the inner portion of the casing. If the cement job has failed it is usual practice to have the cementing company make the repair and it will follow such methods as the conditions indicate as necessary.

If the casing has failed it may be pulled and the damage repaired or in some instances it is possible to force cement behind the casing through the opening admitting the water and in this way avoid the necessity of pulling the string of casing.

Repairing leaks or shutting off bottom water are problems that will require individual attention, depending upon the nature of the work, and are beyond the scope of this article, which treats only of ways of determining whether the shutoff is tight.

Rate of Water Travel Through Sand Varies With Conditions

How far does water travel in an oil sand and how fast in a year, under pressure in repressuring old oil wells, and without pressure, as in a case where an oil sand is flooded by not having been plugged properly or by not having been plugged at all? —J. T.

Your question is so general that it is impossible to give definite answer to it. Water moves through sands at greatly varying rates and many factors enter into the control of this movement.

It is known that in repressuring the rate of water movement in the sand is slow, perhaps only a few inches per day, but in a sand that has never contained oil the water movement may be exceedingly rapid.

In the Bradford Field of Pennsylvania it has been noted that the water may penetrate only 200 or 300 feet from the well in which it is introduced during the first year, while in the San Joaquin Valley fields of California it is not uncommon for water to flow through the sands from one well to another at the rate of several hundred feet per day.

As the distance from the source increases, the water moves more sluggishly, due in part to increased resistance to flow and in part to the wider expanse of sands which it must saturate, while in the Bradford Field the oil may advance 300 feet during the first year following its introduction. During the later years the advance will be much less, averaging after a few years about 35 feet annually.

Eventually equilibrium is reached and no further movement of the water occurs. In the Bradford Field, flow of water practically ceases when a distance of 500 or 500 feet from the source is reached.

You may be able to obtain from the Superintendent of Documents, Government Printing Office, Washington, D. C., a copy of Water Supply Paper 140, published in 1905 and prepared by C. S. Slichter, on "Field Measurements of the Rate of Movement of Underground Waters." The U. S. Geological Survey, Department of the Interior, Washington, D. C., has published many recent papers on underground water conditions in various parts of this country which might be interesting to you also.

There have been numerous articles printed about repressuring and water flooding but they deal mostly with the manner in which the work was carried on and the results, and do not contain much detailed information about rate of water movement.

As for flooding of a sand because of improper plugging of old wells, it is unlikely that any information is available, because state laws provide penalties for improper plugging of wells and it is improbable that anyone who had committed such an error would permit the facts to be published. If you can obtain court records of cases where damage suits have been filed because of improper plugging of wells you might get some evidence from the testimony, but it would apply to the particular case only and would have little bearing upon general conditions.

Wants to Divert Direction of the Hole After Reaching Bedrock

I want to submit something rather unusual in the way of an oil field problem. We are drilling a well, which is now at bedrock at a depth of 318 feet. For reasons that needn't be gone into here we want the hole to be about 60 feet east of the derrick when it gets to 1,200 feet. Possibly it would be best to start over again, but if the hole can be diverted in the desired direction without too much expense or likelihood of trouble we prefer of course to keep on drilling. I think you answered a question somewhat similar to this a few years ago, but I cannot find it.—R. G. T.

You fail to state whether you are drilling with rotary or cable tools. The method to be applied would vary according to the type of equipment in use. In The Oil and Gas Journal of May 28, 1931, on this page you will find recommendations for whipstocking a cable-tool hole, and it is suggested that you read it if you are using this type of equipment.

If you are using rotary equipment it is still possible to divert the hole in the desired direction and continue it in that direction to any desired depth.

Along the Pacific Ocean in California it has been found that some oil sands exist out under the ocean. There are two ways to drill into them. One is to build a structure out in the water for derrick location. The other is to locate the rig on the shore and divert the hole toward the producing formations.

It is understood that many rotary wells have followed the latter practice with good results. It is necessary that the drill hole be carefully surveyed at frequent intervals both for deflection from the vertical and the direction in which the hole is drifting. There are good surveying instruments now available recording both vertically and azimuth and by properly plotting readings secured by their use the true course of a drill hole can be determined accurately.

To deflect the rotary drill bit it is usual practice to use some type of whipstock and when this is run into the hole it is carefully oriented. This same practice can be applied to a problem such as you have, but before starting the actual work it is suggested that a careful survey of the present hole be made and plotted. The rest of the hole can be determined then by projecting it from the bottom of the present hole to the position on the deeper formation where it is desired to bottom the well. After such a drawing or map has been made it is only necessary to check the hole for accuracy in following the course mapped. The mechanical details present no serious problems for a good drilling crew.

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